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NATIONALGEOGRAPHIC.COM/MAGAZINE | FEBRUARY 2008

NATIONAL GEOGRAPHIC



The **Black Pharaohs**

CONQUERORS OF ANCIENT EGYPT

Mexico's Other Border 60 Philippine Eagles 80

Drying of the West 90 Hazaras: Afghanistan's Outsiders 114

Japan's Haiku Master 136

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INTO A PERSON'S SOUL.** Lay your eyes on
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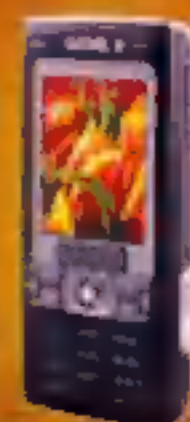
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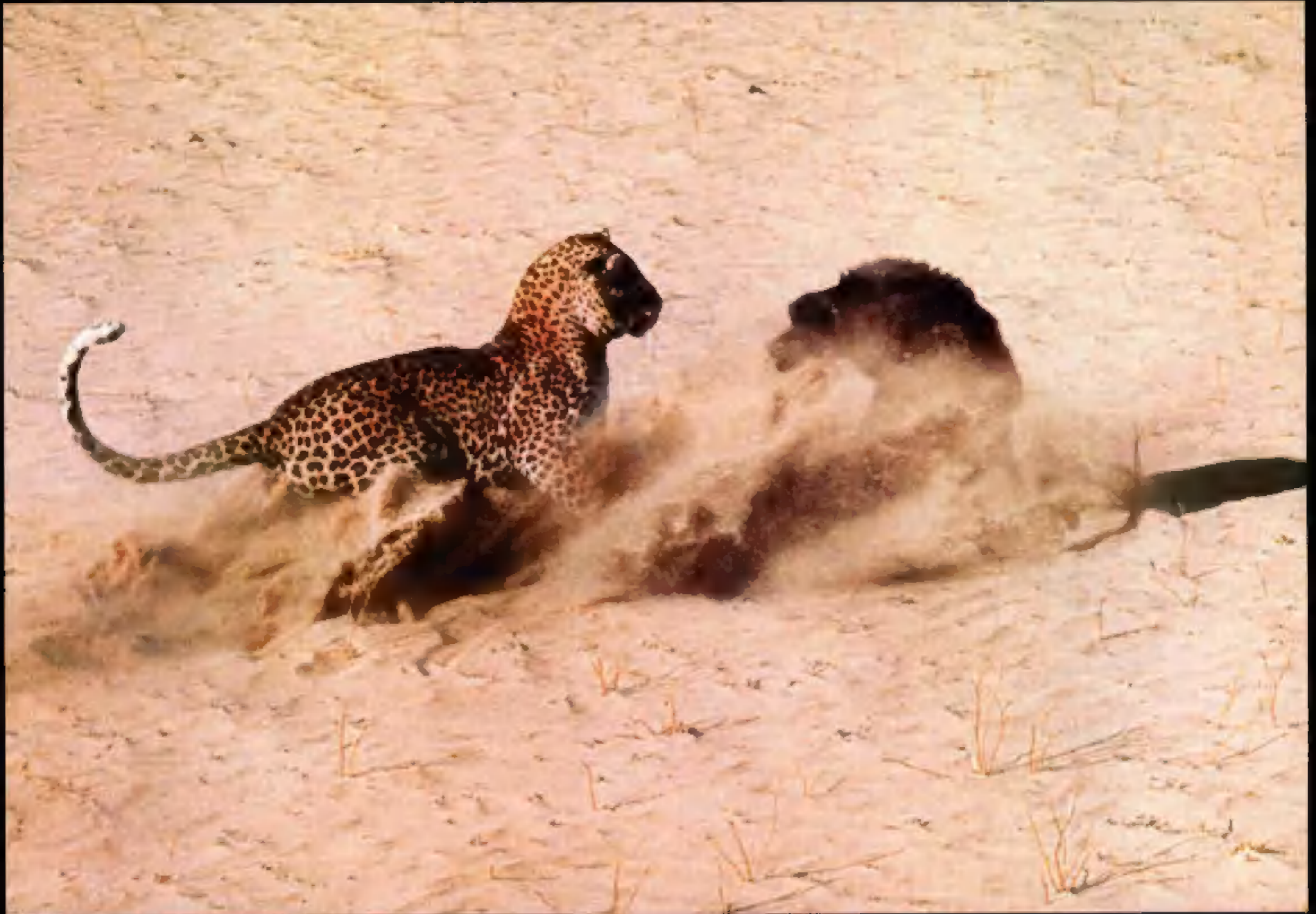
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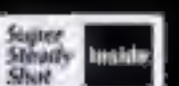
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NATIONAL GEOGRAPHIC

FEBRUARY 2008 • VOL. 213 • NO. 2

Torpekai, 12, is one of Afghanistan's Hazara people. During Taliban rule her grandfather and 70 other men in her village were killed. Today the constitution guarantees the Hazaras equal rights. Though she has yet to go to school, Torpekai hopes to become a doctor. Story on page 114.



STEVE McCURRY

Features

- Black Pharaohs** 34 For 75 years Nubian kings ruled over ancient Egypt, reunifying the country and building an empire. Until recently, theirs was a chapter of history lost in the shadows.
BY ROBERT DRAPER PHOTOGRAPHS BY KENNETH GARRETT
- Mexico's Other Border** 60 Central American immigrants heading north face many hazards—and many crossings—in their risky trek to the “land of marvels.”
BY CYNTHIA GORNEY PHOTOGRAPHS BY ALEX WEBB
- Philippine Eagles** 80 Runaway logging threatens to wipe out one of the world's largest raptors. Now people are waking up to its plight.
BY MEL WHITE PHOTOGRAPHS BY KLAUS NIGGE
- Drying of the West** 90 The region's burgeoning population and intensifying droughts mean there may not be enough water to go around.
BY ROBERT KUNZIG PHOTOGRAPHS BY VINCENT LAFORET
- Outsiders in Afghanistan** 114 The Hazaras cherish education and hard work, but their Shiite Muslim faith and Asian features have long made them a target. Will they find a better life in the post-Taliban era?
BY PHIL ZABRISKIE PHOTOGRAPHS BY STEVE McCURRY
- On the Poet's Trail** 136 Travels along the path of Matsuo Basho, Japan's 17th-century haiku master, help bring his words to life.
BY HOWARD NORMAN PHOTOGRAPHS BY MICHAEL YAMASHITA

COVER Taharqa was the greatest of Egypt's Nubian kings.

ART BY GREGORY MANCHESSE

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Israel's Nahalal Village



Ice Caves of Everest



Aztec Rainmakers

VISIONS OF EARTH 16

TECHNOLOGY

EXPEDITIONS

CLIMATE

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WHERE IN THE WORLD

Departments

Afghanistan
Sweden
Zambia

A Good Egg

Everest Ice Caves

Wild Weather

Aztec Rainmakers

Giant Penguins

Israel's Nahalal Village

Miscellany

- 4** EDITOR'S NOTE
- 8** LETTERS
- 12** YOUR SHOT
- 14** PHOTO JOURNAL
- 150** HOW TO HELP
- 152** INSIDE GEOGRAPHIC FLASHBACK

On the Web

ngm.com

Black Pharaohs

Scholars debate whether ancient Egyptians were black—but agree that modern notions of race did not exist at the time. Learn more, and share your views in a forum.

Fly Like an Eagle

Photographer Klaus Nigge tells how he captured images of the Philippine eagle. The bird with the seven-foot wingspan has been called the world's noblest flier.

Keeping Up With the Climate

The latest reports from *Climate Connections*, an ongoing collaboration between National Geographic and NPR, are posted at ngm.com/climateconnections and npr.org/climateconnections.

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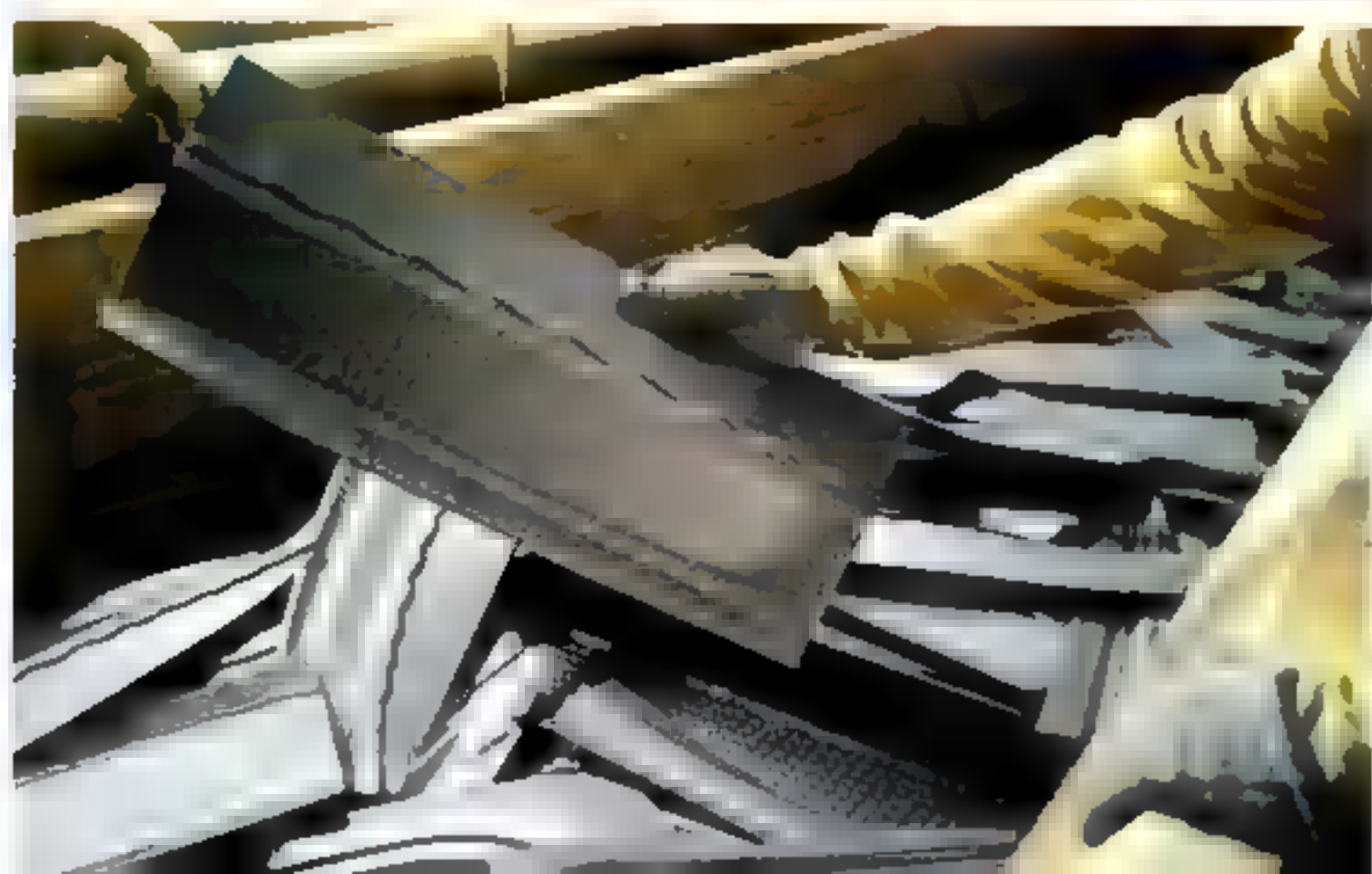
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Carried by the fury of a river in flood, logs, entire trees, even the occasional mobile home batter the Shady Cove bridge. It's late December 1964. The Rogue River, which begins at Crater Lake National Park in Oregon and snakes through the Cascades and Coastal Ranges before spilling into the Pacific, is 50 feet above flood stage. My father and I stand on a bank and watch the bridge, which looks ready to be swept away. Temperatures have risen; heavy rain and snowmelt from the mountains has unleashed so much



Local boys watch Oregon's surging Rogue River in December 1964.

water that the torrent will be remembered as one of the worst recorded floods in the Pacific Northwest.

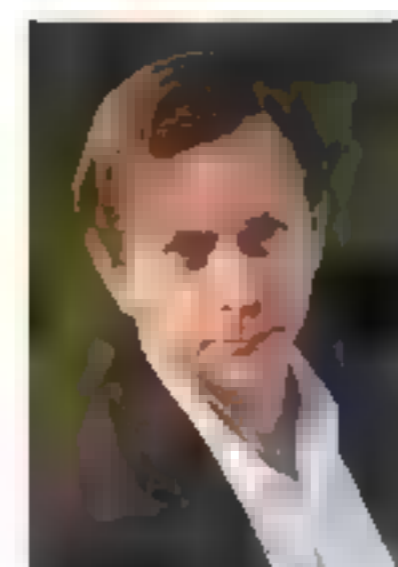
It isn't supposed to happen this way. In the West a heavy accumulation of snow is considered a blessing. The melt fills lakes and reservoirs, irrigates crops, and produces hydroelectric power. It sustains forests and wildlife. It's our lifeline.

The flood of 1964 was a rare event. And even if it were to happen again, new houses crowding the floodplain should be safe. A new dam upstream controls flooding. But water remains a concern in parts of Oregon and neighboring states—only this time, it's the lack of water that's worrisome.

As Robert Kunzig says in "Drying of the West," the wet 20th century is over. As climate changes, so will life in the West.

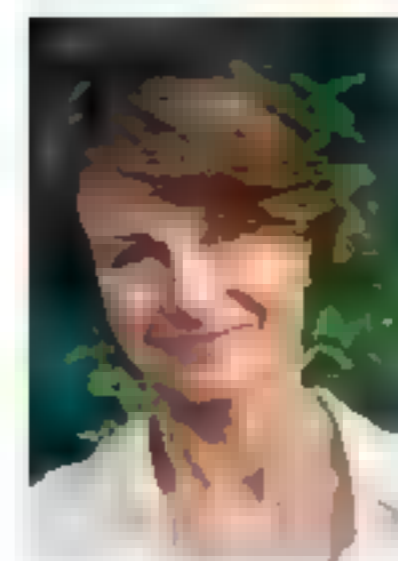
PEOPLE BEHIND THE STORIES

■ **Robert Draper** The "Black Pharaohs" writer also authored *Dead Certain*, a best-selling book about George W. Bush.



"I'm probably the only person in the world," says Draper, "who's gone from interviewing the President in the Oval Office to, 72 hours later, standing at the grave site of another famous leader, the pharaoh Taharqa."

■ **Cynthia Gorney** "My grandfather was a Polish Jew who emigrated to Mexico in 1924," says Cynthia Gorney, who wrote "Mexico's Other Border."



"My father and aunt were born and raised there, making them sort of double immigrants by the time they got to the States." For a time, Gorney's grandfather was a traveling salesman. Visiting a Tapachula plantation house built by German coffee growers in the 1920s, she realized: "This must have been part of my grandfather's sales territory."

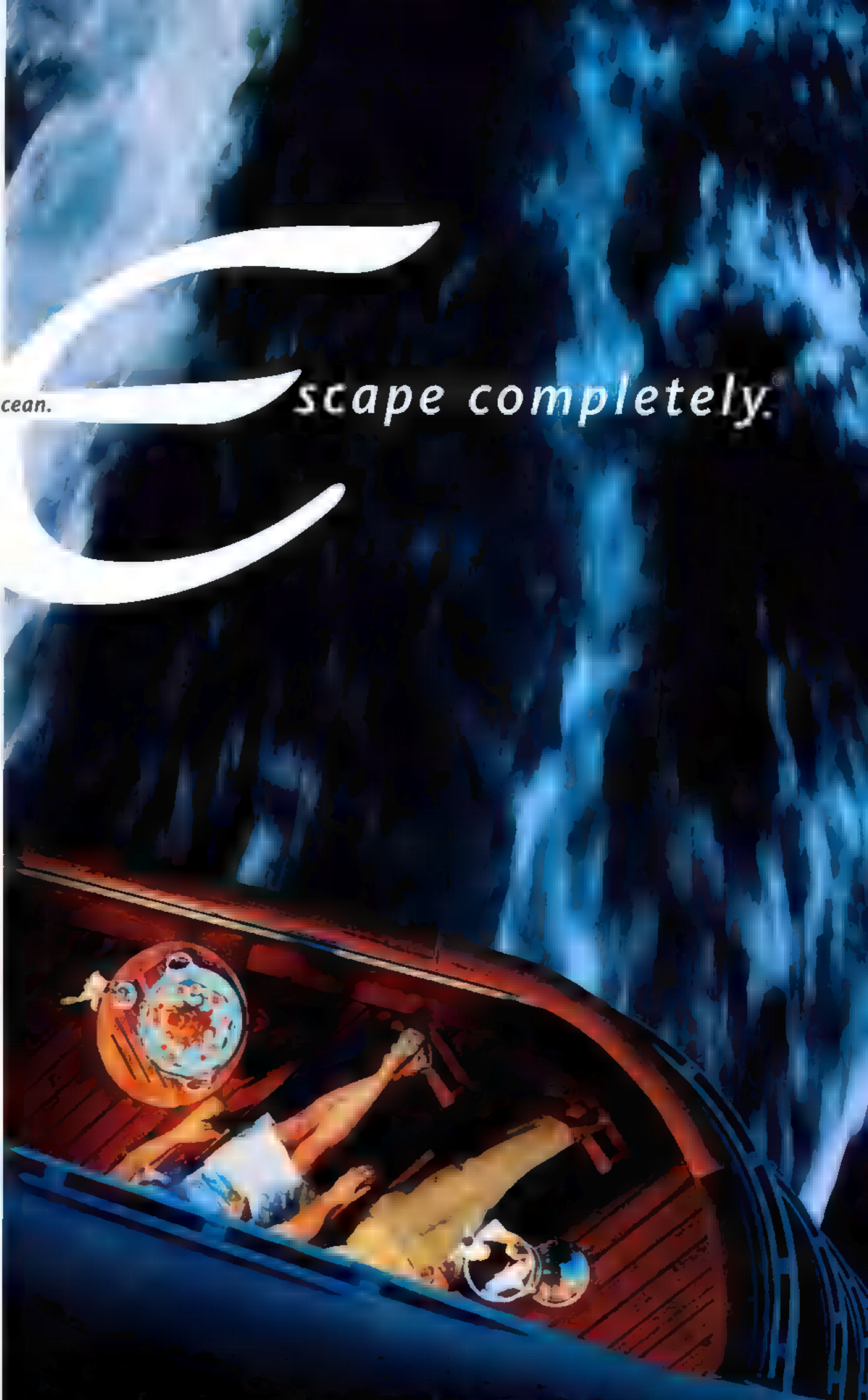
■ **Phil Zabriskie** Working in the Afghan winter gave Phil Zabriskie an idea of seasonal hardships faced by the Hazara people he was writing about. Trying to cross a 13,000-foot mountain pass in a car, "we spent hours shoveling



snow off the road, with the help of the local shepherds—who were walking the same route."

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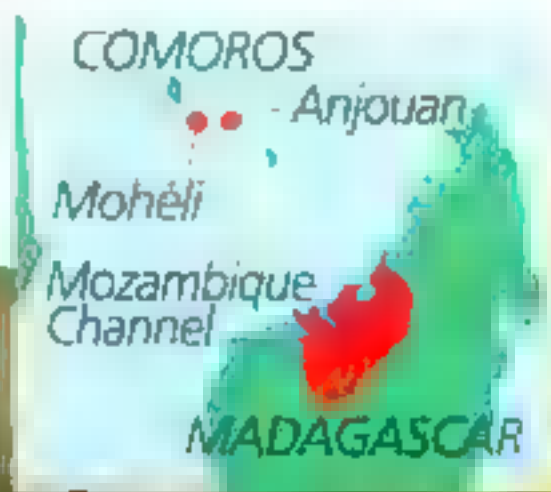
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Mongoose Lemur (*Eulemur mongoz*)

Size: Head and body length, 30 - 35 cm (12 - 14 inches); tail, 45 - 48 cm (18 - 19 inches)

Weight: 1.1 - 1.6 kg (2.4 - 3.5 lbs) **Habitat:** Tropical dry deciduous and secondary forests in Madagascar; also found on two islands in the Comoros **Surviving number:** Estimated at 1,000 - 10,000



Photographed by Pete Oxford

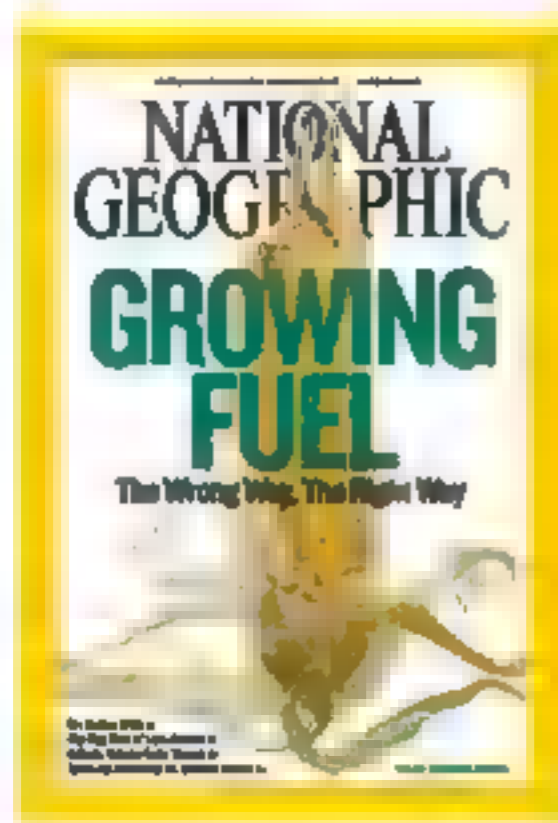
WILDLIFE AS CANON SEES IT

Ladies first. That's how it works for the mongoose lemur, as the female occupies the dominant position in the hierarchy. Family groups stay close together when traveling and feeding, but first choice in food and the lead in mating go to her. Females do present a united front with males when defending their territory from other groups through displays of aggression, including vocalizations, charges and scent marking. But there are certain

dangers against which even the most ferocious displays offer no defense. Chief among these life-threatening perils are habitat loss, hunting, and capture for the pet trade. Can the lemurs last?

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October 2007 *"The Space Age at 50" did not resonate with one reader considerably younger. "Do the dreams of the many not outweigh the dreams of a few?" asks Caleb Jones, 16, of Graysville, Manitoba. "The space program has taken funding and literally set it on fire. As I flip through the October issue, I see the biggest threat to human life, global warming."*

➤ Comment on February stories at ngm.com.

Green Dreams

Our corn-for-fuel program in the U.S. clearly fits your cover-page category of "The Wrong Way." The "green dream" has become ■ food-cost nightmare proving that the concept of using food for fuel is extremely foolish. Our policymakers have been duped by the elitist position of reducing gasoline usage at any cost. In this case there are no benefits and the cost is far too great. Consumers need to just say no to any fuel produced from corn or any other source of food.

BOB BERLING
Red Feather Lakes, Colorado

Thank you for the coverage of a topic that must be dealt with not in the future but now. Obviously, sugarcane is far more productive than corn when it comes to ethanol. The United States has ■ large source of cane alcohol almost ready

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to be produced. The state of Hawaii has grown huge amounts of cane for over a century. Thousands of acres are there, many currently fallow. Also idle are the harvesting equipment, the workers, the roads, and even the huge sugarcane mills. The only thing needed are distillation plants. Yet nothing is being done. Not only could Hawaii become the first state to be petroleum free, but it could export a large amount of ethanol, especially to the West Coast of the U.S.

GARY STELLERN
Pasadena, California

I work in Costa Rica, where President Oscar Arias announced in 2007 that the country aims to be carbon neutral by 2021. He wants to mandate a 7 percent ethanol mix into gasoline as well as possibly mixing biodiesel. CATIE, a Latin American agricultural and natural resource research center, is interested in forming guidelines for the sustainable production of biofuels. A certification process needs to be set up to improve the social, economic, and environmental conditions that biofuels are produced in. Fortunately, there is a worldwide effort to determine these standards, headed by the Roundtable on Sustainable Biofuels. I hope

we will be able to reduce dependence on foreign oil by improving agricultural efficiency, without destroying remaining forests.

TAMARA J. BENJAMIN
Research Scientist
Purdue University/CATIE
Turrialba, Costa Rica

While researching cash-crop alternatives to poppies in Afghanistan, I learned that prairie grasses such as switchgrass provide not only an alternative biofuel source but also afford excellent grazing and erosion control. I was led to switchgrass just before I went to Afghanistan by your article "Future Power" (August 2005). We subsequently started ■ pilot project for Afghan farmers to switch to switchgrass.

ALAN WOOD
Mechanicsburg, Pennsylvania

As a small-town soybean farmer, I disagree that biofuels benefit only "some farmers and agricultural giants." Virtually all family farmers like me, and the U.S. economy, benefit from biofuels. This keeps our nation's money at home while investing in our ability to increase U.S. fuel production capacity. Farmers can grow both food and fuel. They need not compete with each other. Breakthroughs with cellulosic ethanol and biodiesel from algae will fuel this revolution. As for blaming the high price of cornflakes on biofuels, do the research. The true culprit is high petroleum costs. And what can help by expanding our fuel supply? Biofuels.

ED HEGLAND
Governing Member
National Biodiesel Board
Appleton, Minnesota



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LETTERS

Carbon's New Math

Constant hectoring to drive little cars, use fluorescents, and use public transit would be more credible if those doing the hectoring were willing to live like that, but they aren't. We do not "drive alone because it's more convenient." We drive alone because we have to. How many *National Geographic* authors and photographers take public transportation to work? I know they have excuses—remote locations, heavy gear, etc.—but so does everybody else. For me to take public transportation would turn my one-hour driving commute to well over 16 hours each way. Frankenstein created a monster that so enraged people that they rampaged with torches and pitchforks. Global warming activists are in danger of the same mistake. If enough people start freezing in the dark, they might just revolt against science and send us into a dark age that makes the ninth century look technologically advanced.

CHRISTOPHER CAMPBELL
Belfair, Washington

Corrections, Clarifications

October 2007:

Green Dreams The graphic on page 54 misstated the retail price for biodiesel in Germany. The correct figure for June 2007 was \$5.33 a gallon. The correct price to get the energy equivalent of one gallon of diesel fuel was \$6.20. Also, the stated \$250 weekly pay for a sugarcane cutter, including taxes and benefits, can vary widely. Take-home pay averages about \$100.

Geography: A World Loses Its Tongues South America's Zaparo people should be listed in Hotspot 4 instead of Hotspot 3.

Your article on cutting carbon dioxide emissions inexplicably failed to consider nuclear power. Its production generates negligible carbon dioxide and could make an important contribution to averting catastrophe. Witness France, which produces more than half of its electricity via nuclear power.

LIONEL JAFFE
Woods Hole, Massachusetts

How many *National Geographic* authors and photographers take public transportation to work? I know they have excuses—remote locations, heavy gear, etc.—but so does everybody else.

The "stabilization wedges" that summarize ways to reduce emissions are all well and good and would certainly achieve the desired effect if implemented, but the list is, sadly, missing the one wedge that would be the most effective: population control. Most researchers who suggest ways to stop the planet warming neglect this. Is birth control too much of a political hot potato for them? Incentives for it could be implemented worldwide.

HERB STUBBMANN
Ocean, New Jersey

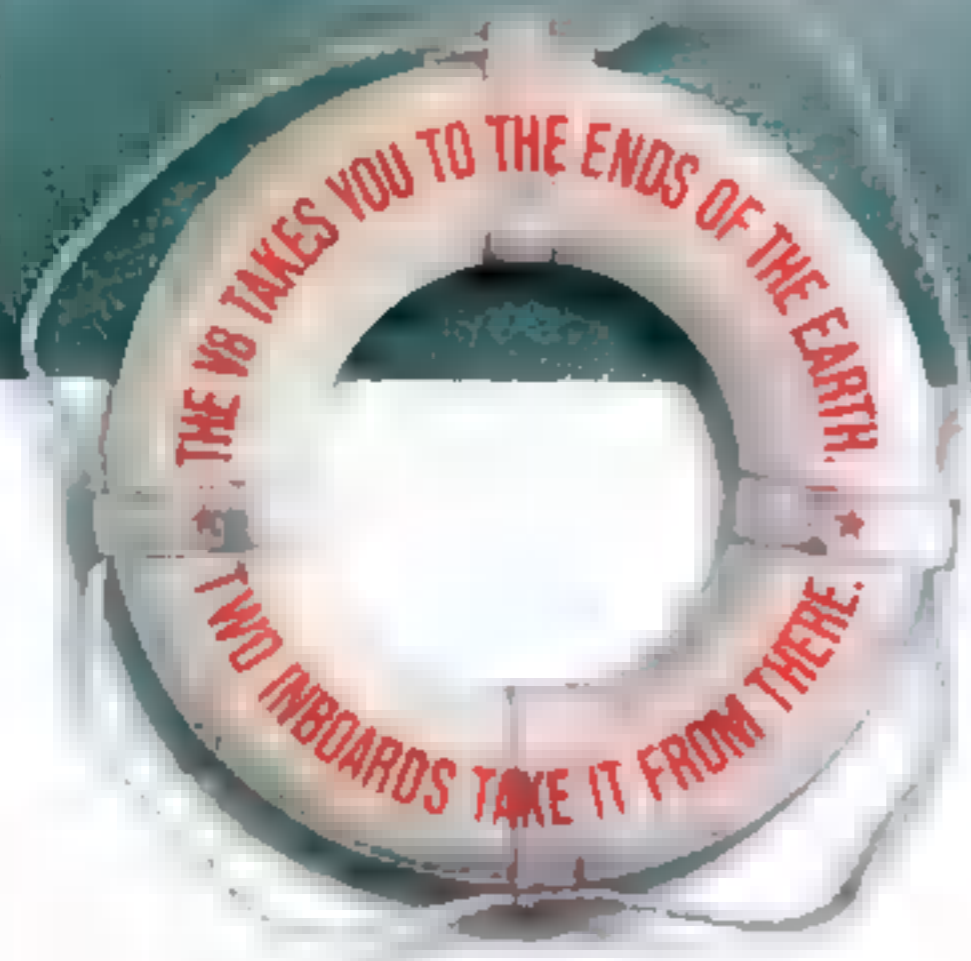
The ice is going to melt, the oceans are going to rise, and

a lot of the coastal cities around the world are going to be underwater. Start preparing for it. The global warming hysteria has at least been a wake-up call to spend money for research in renewable energy solutions. The real threat to human survival is not melting ice, but lack of energy. If we can capture the energy of the sun, the wind, and the oceans, we will be able to survive not only this warm-up, but also the eventual cooldown to come. There will be global warming, and there will be another ice age in the distant future. The difference is that we are documenting the change on paper and computers instead of cave walls.

DAVE NICLEY
Canton, Michigan

Approximately one-half the electricity generated in the U.S. is produced by burning coal, the dirtiest fuel in use today. To alleviate some of this pollution, I suggest that builders build homes with solar panels on the roof as standard equipment. The added cost will be an insignificant addition to the total home price. If this practice can be promulgated throughout the industry, our nation can make a significant stride in the reduction of that global warming culprit, carbon. A further incentive will be the reduction in the homeowner's electricity bill. Incidentally, I'm retired, living in the last home I'll ever own, and am not in the real estate market. I can't envision why this practice has not been given serious consideration by homebuilders in the past. It isn't that they are unaware of the potential.

ELON HOLMAN
Roseville, California



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LETTERS

Dark Passage

Peter Gwin must come in for special praise for his story on the pirates of the Strait of Malacca. The great balance between capturing the atmosphere of the place and avoiding romanticizing the *lanun* yielded writing that should garner prizes for your magazine. Somewhere between the phantom swiftlets of Jodoh and Jhonny Batam's golden mean, I was transported to that world in ways not even photos could manage.

ART HOMER
Peru, Nebraska

What a wonderful story! Reading it, I could clearly visualize your author talking to the pirate from the *Nepline Delima* incident in jail and watching the "flying squirrels" scrambling up to the deck of a ship. Your author did a wonderful job of research—speaking with actual players to get the flavor of what that life is like, and combining it with statistics about what governments in the region are doing to combat piracy. His portrayal of Jhonny Batam showed the magnanimous show-off and hinted at the malice lurking just below the surface. It was the stuff of which movies are made.

MATTHEW M. SIKES
Washington, D.C.

The Space Age at 50

What has happened to America's technological mastery of human spaceflight? I look up at Mars and wonder whether we'll ever get there. I fear the U.S. manned space program is lost in space and going nowhere! If President Bush were a true space enthusiast, he would follow through on

his commitment to space exploration with priority funding for NASA. Space exploration is an investment in our future and will move humanity past war and aggression on Earth. Human exploration of the moon, Mars, and beyond would restore national pride and bring purpose to our space program.

RICK SCHREINER
San Marino, California

Even if private space ventures manage to halve the cost of launches, they are still a dead end. They will never manage to give man anything more than an expensive toehold in space.

Sending men to live on the moon and eventually Mars is a worthy goal, but the 200 billion dollars now intended for Bush's program would be far better spent in developing the physics and engineering for breakthrough launch systems: nuclear rockets, space elevators, space fountains, laser-powered rockets, or whatever else anyone is capable of dreaming up and making work. Even if private space ventures manage to halve the cost of launches from chemical rockets, they are still a dead end: They will never manage to give man anything more than an expensive toehold in

space. The steam age did not begin with Hero of Alexandria or even Thomas Newcomen; the space age, far from being 50 years old, has not even begun.

NICHOLAS CHUBRICH
Waltham, Massachusetts

I agree with the assessment that robotic missions are a much higher priority. While it was true that nearly every television in the world was tuned in to watch the first moon landing in 1969, NASA missions now barely get a ten-second sound bite. Unfortunately, those euphoric early days of NASA are over. Spending trillions trying to get them back by returning to the moon or going to Mars might be misdirected. However, nearly every television in the world might tune in to capture some of that lost euphoria on a much less expensive robotic mission to [Jupiter's moon] Europa to see what might be living in its ocean.

DAVE BEACH
Shaftsbury, Vermont

Deadly Contact

I have subscribed to your publication for some time and look forward to it each month. But the photograph on page 90 of a trussed-up animal being butchered on the street was vile and despicable. This picture was a major detraction from what was an otherwise interesting and informative article, which is precisely why I am a subscriber. I presume your editors wish to expand their circulation not drive the readers away.

ART BROCKWAY
Auburn, Washington

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A Little Puzzling And we don't mean this fish or this young man (although we wonder about them too). The Your Shot editors' Daily Dozen photographic picks are now available as timed online puzzles—in jigsaw or sliding-grid form—on the Your Shot website. Send us your own photo, and see if it ends up in pieces. For guidelines, a submission form, and more information, go to ngm.com/yourshot.



Jim Chambers

Tucker, Georgia

"After I graduated from Georgia Tech in 1968, one of my first paychecks went for a Nikon and ■ 50mm lens," says Jim Chambers, who's been shooting ever since. He's now 61 and retired. Chambers found this male jawfish incubating eggs in its mouth off Little Cayman Island. "I can't imagine diving without ■ camera in my hands," he says.



Logan Crable

Richmond, Virginia

First Logan Crable pointed the leaf blower at his little brother. "He was not happy," notes Crable, 19. So Crable—with a camera in his other hand—pointed the yard tool at himself. Please don't try this at home.



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In 2001, 79-year-old Harlow Cagwin cut the last field of hay on his Illinois farm.

More work by award-winning photographer Scott Strazzante can be seen online at chicagotribune.com.

Farmed Out Harlow and Jean Cagwin watched as their Lockport, Illinois, farmhouse was demolished on July 2, 2002, to make way for a housing subdivision. That day marked the end of Harlow's 75 years on the farm where he'd grown up, and the end of my eight-year-long personal project documenting the Cagwins' daily struggles to raise a profitable herd of beef cattle on 118 hardscrabble acres 35 miles southwest of Chicago.

Nearly five years later I was showing the Cagwin story to a photography class at the College of DuPage. As the lights came up, I said I hoped to return to Lockport someday and photograph

another family's life on the Cagwin land, as a sort of bookend to the original project. One of the photo students raised her hand. "I live in that subdivision," Amanda Grabenhofer said. Like Jean and Harlow years before, Amanda and her husband opened their home to me. But it wasn't just the welcome that seemed familiar. Every time I visited Cinnamon Court, I'd see moments that echoed pictures from the farm—like four-year-old Caitlyn (left), diligently working over the sunlit grass with a toy lawn mower as red as Harlow's old tractor (above). And this new project began to grow.





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THEN After he shot the obviously well-fattened “herd” of pets at the Grabenhofers (below), Scott Strazzante knew he could find a match among his Cagwin negatives. From the broad, glossy heads of Black Angus cattle at the feed trough, to the men in plaid shirts, “the similarities can be almost eerie,” Strazzante says.



NOW No strangers to the feed bowl, Grabenhofer pets line up in the kitchen: broad, broader, broadest. Dogs Noel and Molly (right and center) live with Amanda, Ed, and their children on Cinnamon Court; Molly’s sister Zoey (left) is a guest chowhound, brought by Ed’s parents, Fred and Sharon (above), to share a babysitting visit.

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THEN Lunch in the Cagwins' farm kitchen was generally something simple—a peanut butter and jelly sandwich, a handful of celery sticks—prepared by Jean. “Harlow comes from a generation of men who were accustomed to sitting down at the table and waiting for their wives to bring in the food,” Strazzante says.



NOW At dinnertime on the Grabenhofers' cul-de-sac, Ben slumps next to the milk and biscuits, face-in-plate exhausted, while his brother and sisters squeeze the last bits of fun from the long summer day. The meal is a joint effort: While mother Amanda bustles in the kitchen, father Ed is out back tending the grill.

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THEN In the final years Jean (at left in background) and Harlow worked their Lockport farm, Strazzante saw Harlow taking more and more breaks. “He’d had surgery on his hands, and he had arthritis,” the photographer recalls. “He’d stop when he got out of breath—but then he’d get up and go back to work.”



NOW Not quite grown into their tools, four-year-olds Abigail (left) and Caitlyn rake backyard soil over seeds meant to become a garden for butterflies. “Their mom believes kids should have chores and play outside,” Strazzante says. Last October the girls celebrated their fifth birthdays. The party featured a barnyard theme.



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AMBIEN CR is a treatment option you and your healthcare provider can consider along with lifestyle changes and can be taken for as long as your provider recommends. Until you know how AMBIEN CR will affect you, you shouldn't drive or operate machinery. Be sure you're able to devote 7 to 8 hours to sleep before being active again. Sleepwalking, and eating or driving while not fully awake, with amnesia for the event, have been reported. If you experience any of these behaviors contact your provider immediately. In rare cases, sleep medicines may cause allergic reactions such as swelling of your tongue or throat, shortness of breath or more severe results. If you have an allergic reaction while using AMBIEN CR, contact your doctor immediately. Side effects may include next-day drowsiness, dizziness, and headache. It's non-narcotic; however, like most sleep medicines, it has some risk of dependency. Don't take it with alcohol.

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INFORMATION FOR PATIENTS TAKING AMBIEN CR

Your doctor has prescribed Ambien CR to help you sleep. The following information is intended to guide you in the safe use of this medicine. It is not meant to take the place of your doctor's instructions. If you have any questions about Ambien CR tablets be sure to ask your doctor or pharmacist.

Ambien CR is used to treat different types of sleep problems, such as:

- trouble falling asleep
- waking up often during the night

Some people may have more than one of these problems.

Ambien CR belongs to a group of medicines known as the "sedative/hypnotics", or simply, sleep medicines. There are many different sleep medicines available to help people sleep better. Sleep problems are usually temporary, requiring treatment for only a short time, usually 1 or 2 days up to 1 or 2 weeks. Some people have chronic sleep problems that may require more prolonged use of sleep medicine. However, you should not use these medicines for long periods without talking with your doctor about the risks and benefits of prolonged use.

SIDE EFFECTS

Most common side effects:

- headache
- somnolence (sleepiness)
- dizziness

You may find that these medicines make you sleepy during the day. How drowsy you feel depends upon how your body reacts to the medicine, which sleep medicine you are taking, and how large a dose your doctor has prescribed. Daytime drowsiness is best avoided by taking the lowest dose possible that will still help you sleep at night. Your doctor will work with you to find the dose of Ambien CR that is best for you.

To manage these side effects while you are taking this medicine:

- When you first start taking Ambien CR or any other sleep medicine until you know whether the medicine will still have some carryover effect in you the next day, use extreme care while doing anything that requires complete alertness, such as driving a car, operating machinery, or piloting an aircraft.
- NEVER drink alcohol while you are being treated with Ambien CR or any sleep medicine. Alcohol can increase the side effects of Ambien CR or any other sleep medicine.
- Do not take any other medicines without asking your doctor first. This includes medicines you can buy without a prescription. Some medicines can cause drowsiness and are best avoided while taking Ambien CR.
- Always take the exact dose of Ambien CR prescribed by your doctor. Never change your dose without talking to your doctor first.

SPECIAL CONCERNS

There are some special problems that may occur while taking sleep medicines.

"Sleep-Driving" and other complex behaviors: There have been reports of people getting out of bed after taking a sleep medicine and driving their cars while not fully awake, often with no memory of the event. If you experience such an event, it should be reported to your doctor immediately, since "sleep-driving" can be dangerous. This behavior is more likely to occur when Ambien CR is taken with alcohol or other drugs such as those for the treatment of depression or anxiety. Other complex behaviors such as preparing and eating food, making phone calls, or having sex have been reported in people who are not fully awake after taking a sleep medicine. As with "sleep-driving", people usually do not remember these events.

Memory problems: Sleep medicines may cause a special type of memory loss or "amnesia." When this occurs, a person may not remember what has happened for several hours after taking the medicine. This is usually not a problem since most people fall asleep after taking the medicine.

Memory loss can be a problem, however, when sleep medicines are taken while traveling, such as during an airplane flight and the person wakes up before the effect of the medicine is gone. This has been called "traveler's amnesia."

Be sure to talk to your doctor if you think you are having memory problems. Although memory problems are not very common while taking Ambien CR, in most instances, they can be avoided if you take Ambien CR only when you are able to get a full night's sleep (7 to 8 hours) before you need to be active again.

Tolerance: When sleep medicines are used every night for more than a few weeks, they may lose their effectiveness to help you sleep. This is known as "tolerance." Sleep medicines should, in most cases, be used only for short periods of time, such as 1 or 2 days and generally no longer than 1 or 2 weeks. If your sleep problems continue, consult your doctor, who will determine whether other measures are needed to overcome your sleep problems.

Dependence: Sleep medicines can cause dependence, especially when these medicines are used regularly for longer than a few weeks or at high doses. Some people develop a need to continue taking their medicines. This is known as dependence or "addiction."

When people develop dependence, they may have difficulty stopping the sleep medicine. If the medicine is suddenly stopped, the body is not able to function normally and unpleasant symptoms may occur (see *Withdrawal*). They may find that they have to keep taking the medicines either at the prescribed dose or at increasing doses just to avoid withdrawal symptoms.

All people taking sleep medicines have some risk of becoming dependent on the medicine. However, people who have been dependent on alcohol or other drugs in the past may have a higher chance of becoming addicted to sleep medicines. This possibility must be considered before using these medicines for more than a few weeks.

If you have been addicted to alcohol or drugs in the past, it is important to tell your doctor before starting Ambien CR or any sleep medicine.

Withdrawal: Withdrawal symptoms may occur when sleep medicines are stopped suddenly after being used daily for a long time. In some cases, these symptoms can occur even if the medicine has been used for only a week or two.

In mild cases, withdrawal symptoms may include unpleasant feelings. In more severe cases, abdominal and muscle cramps, vomiting, sweating, shakiness, and rarely, seizures may occur. These more severe withdrawal symptoms are very uncommon.

Another problem that may occur when sleep medicines are stopped is known as "rebound insomnia." This means that a person may have more trouble sleeping the first few nights after the medicine is stopped than before starting the medicine. If you should experience rebound insomnia, do not get discouraged. This problem usually goes away on its own after 1 or 2 nights.

If you have been taking Ambien CR or any other sleep medicine for more than 1 or 2 weeks, do not stop taking it on your own. Always follow your doctor's directions.

Changes in behavior and thinking: Some people using sleep medicines have experienced unusual changes in their thinking and/or behavior. These effects are not common. However, they have included:

- more outgoing or aggressive behavior than normal
- confusion
- strange behavior
- agitation
- hallucinations
- worsening of depression
- suicidal thoughts

How often these effects occur depends on several factors, such as a person's general health, the use of other medicines, and which sleep medicine is being used.

It is also important to realize that it is rarely clear whether these behavior changes are caused by the medicine, an illness, or occur on their own. In fact, sleep problems that do not improve may be due to illnesses that were present before the medicine was used. If you or your family notice any changes in your behavior, or if you have any unusual or disturbing thoughts, call your doctor immediately.

Pregnancy: Sleep medicines may cause sedation of the unborn baby when used during the last weeks of pregnancy.

Be sure to tell your doctor if you are pregnant, if you are planning to become pregnant, or if you become pregnant while taking Ambien CR.

SAFE USE OF SLEEPING MEDICINES

To ensure the safe and effective use of Ambien CR or any other sleep medicine, you should observe the following cautions:

1. Ambien CR is a prescription medicine and should be used ONLY as directed by your doctor. Follow your doctor's instructions about how to take, when to take, and how long to take Ambien CR. Ambien CR tablets should not be divided, crushed, or chewed, and must be swallowed whole.
2. Never use Ambien CR or any other sleep medicine for longer than directed by your doctor.
3. If you develop an allergic reaction such as rash, hives, shortness of breath or swelling of your tongue or throat when using Ambien CR or any other sleep medicine, discontinue Ambien CR or other sleep medicine immediately and contact your doctor.
4. If you notice any unusual and/or disturbing thoughts or behavior during treatment with Ambien CR or any other sleep medicine, contact your doctor.
5. Tell your doctor about any medicines you may be taking, including medicines you may buy without a prescription. You should also tell your doctor if you drink alcohol. DO NOT use alcohol while taking Ambien CR or any other sleep medicine.
6. Do not take Ambien CR unless you are able to get a full night's sleep before you must be active again. For example, Ambien CR should not be taken on an overnight airplane flight of less than 7 to 8 hours since "traveler's amnesia" may occur.
7. Do not increase the prescribed dose of Ambien CR or any other sleep medicine unless instructed by your doctor.
8. When you first start taking Ambien CR or any other sleep medicine, until you know whether the medicine will still have some carryover effect in you the next day, use extreme care while doing anything that requires complete alertness, such as driving a car, operating machinery, or piloting an aircraft.
9. Be aware that you may have more sleeping problems the first night after stopping Ambien CR or any other sleep medicine.
10. Be sure to tell your doctor if you are pregnant, if you are planning to become pregnant, or if you become pregnant while taking Ambien CR or any other sleep medicine.
11. As with all prescription medicines, never share Ambien CR or any other sleep medicine with anyone else. Always store Ambien CR or any other sleep medicine in the original container that you received it in and store it out of reach of children.
12. Ambien CR works very quickly. You should only take Ambien CR right before going to bed and are ready to go to sleep.

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Sweden The facial disk of feathers circling this great gray owl's eyes channel forest-floor sounds back to its ears, helping the bird pounce on a vole and carry it away.







Zambia The 355-foot drop of Victoria Falls just inches away, a swimmer stands at the lip of a hidden pool—an eight-foot-deep divot in the riverbed rock—accessible only when the Zambezi River runs low.

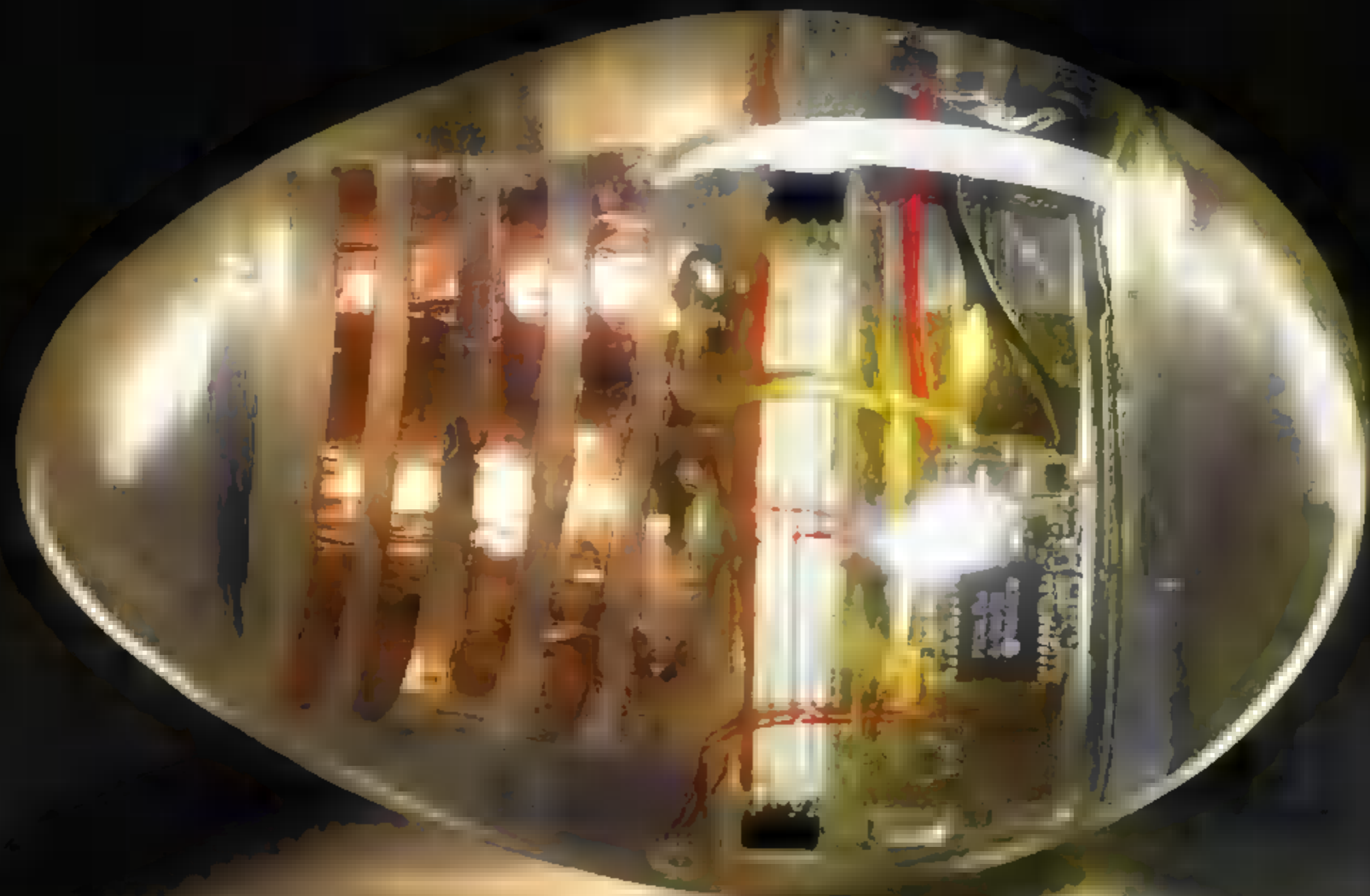


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PHOTO: ANNIE GRIFFITHS BELT, NATIONAL GEOGRAPHIC IMAGE COLLECTION



A telemetric egg sends data from a nest. Some birds require a painted egg. Others don't mind visible innards.



Eavesdropping Egg When a kori bustard (left) in a U.S. zoo lays her two-by-three-inch egg, keepers whisk it off to an incubator. Even in a zoo, hawks and raccoons can strike; the father might also harm the egg. The mom usually gets a plaster stand-in. But at the Smithsonian's National Zoo in Washington, D.C., the dummy is high-tech (above). Measuring temperature and motion, it detects when the egg is turned. By learning how the mother treats the egg, zoos hope to improve hatching methods. That's vital since numbers of the world's heaviest flying birds—they top out at 40 pounds—are dropping in their African home. Threats to the kori include habitat loss and hunting. But there's no need to chase them for their feathers, prized for fishing flies. A big plume from a wild bird used to go for \$300. Now zoos give molted feathers away for free. —Helen Fields



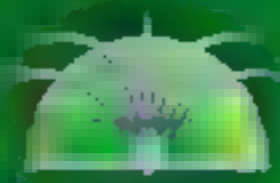
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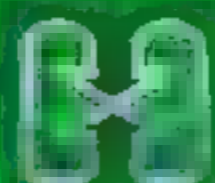
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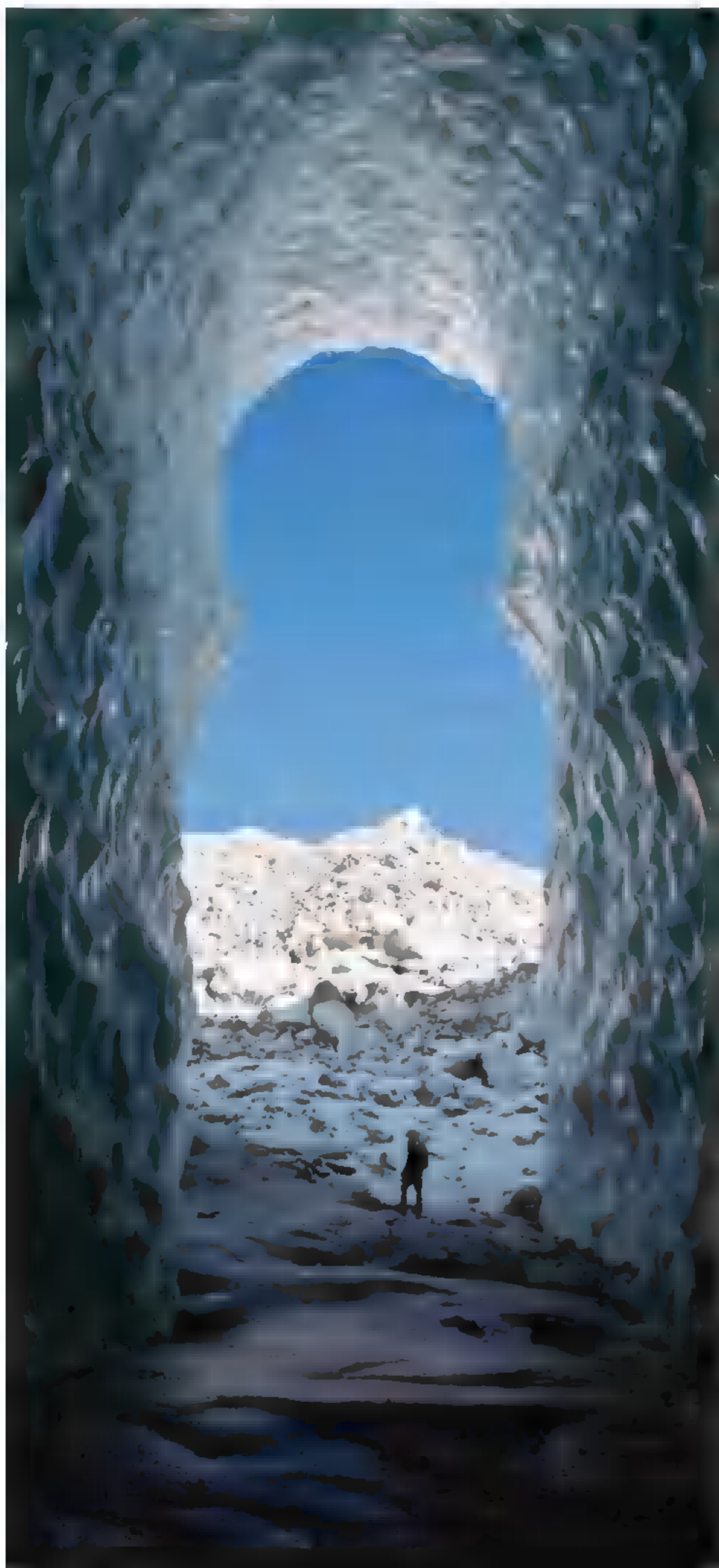


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NG GRANTEE

Guts of a Glacier

It seems the roof of the world has a pretty cool basement as well. Under the frozen surfaces of Himalayan glaciers on the flanks of Mount Everest and its fellow giant peaks, caves wind through the ice. They follow tortuous paths carved out by flowing meltwater, with breathtaking underground formations and claustrophobic squeezes that open into huge galleries.

But glaciologist Doug Benn, of the University Centre in Svalbard, Norway, isn't there to sightsee. He's surveying the caves with support from the National Geographic Society. As climate change heats up, how glaciers melt is a life-and-death question. The fate of polar-region ice sheets will determine whether sea level rises inches, feet, or yards in the coming century. The plumbing system inside glaciers is poorly understood. So Benn and his colleagues are going beneath the surface to track how water eats away at glaciers from the inside. "What we see on the surface is just part of the story," Benn says. For now, the answers lie buried in the ice. —Chris Carroll

Water from a glacial lake punched through the ice and poured out this nearly hundred-foot-tall archway.





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Social Environmental Advocate Alexandra Cousteau works to inspire and empower individuals to protect not only oceans and sea creatures, but human communities for whom pure water is so essential.



Marine Conservationist Brad Norman uses a breakthrough photo analysis technique to identify and protect the endangered whale shark, opening a new era in animal recognition.



Biological Anthropologist Jill Pruetz conducts fieldwork around the world, shedding new light on how ecology influences today's primates and shaped early human behavior.

Sustainable Agriculture and Development Experts Cid Simoes and Paola Segura create innovative agribusiness projects that help Brazil's small farmers prosper while protecting threatened habitats.



Wildlife Conservationist Hammerskjoeld Simwina restores Zambia's wildlife and transforms poverty stricken areas by providing sustainable economic alternatives to poaching.



Environmental Conservationist Tsetsegee Munkhbayar protects Mongolia's precious water resources from unregulated mining by raising grassroots awareness and influencing crucial legislative change.



Humanitarian and Musician Zinhle Thabethe uses the power of music and front-line activism to provide hope, education, and medicine for South Africans afflicted with HIV.

Photos (from top to bottom):

Alexandra Cousteau

Rolex Awards/Kurt Amsler

Jim Haemstra

Victor Sanchez

Goldman Environmental Prize/

John Antonelli

Goldman Environmental Prize/

William Foerderer/Infante

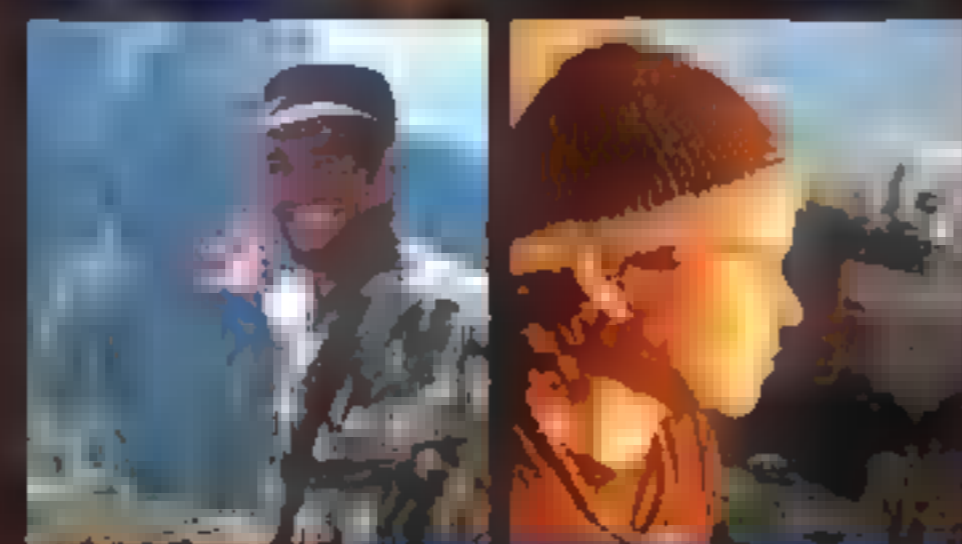
Kris Krug

Josh Thome (l), Sol Guy (r)

Christian Ziegler

Photo (opposite page):

Stephen Alvarez



New Media Cultural Storytellers Sol Guy and Josh Thome reach and inspire a new generation to engage on today's most pressing issues through entertainment, online education, and live events.



Zoologist and Physiological Ecologist Martin Wikelski leads development of an unprecedented animal migration database, comparing long-lost records with new findings to show how climate change, altered landscapes, and other factors drive animal movement.



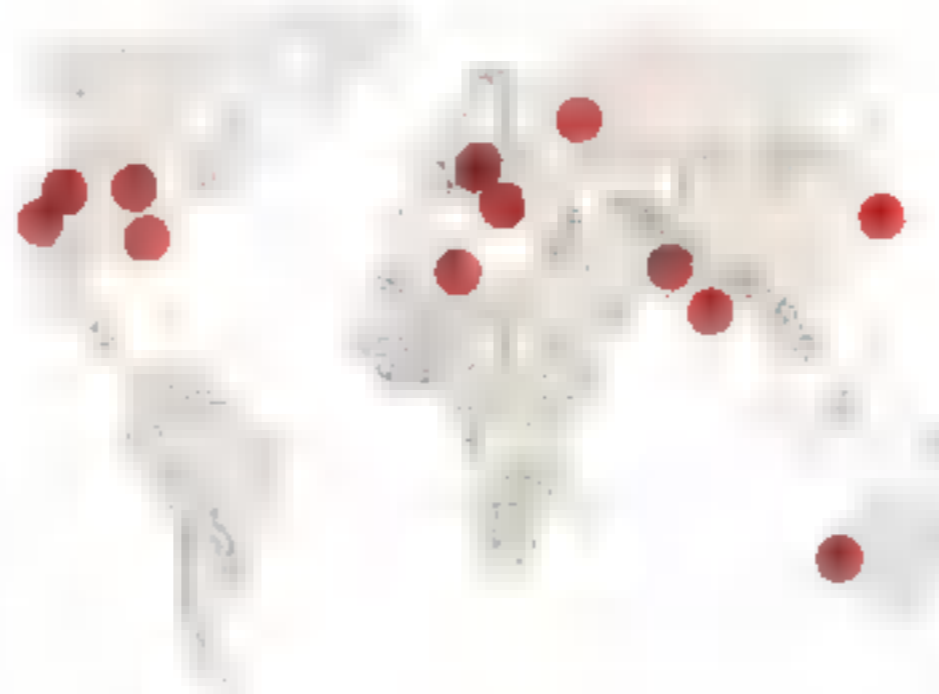
Wild Weather Hell may not have frozen over yet, but the weather on Earth is getting almost as outlandish. In the span of a year, there's been a laundry list of far-out conditions: unlikely 90-degree heat in Moscow, snow blanketing much of temperate South Africa, hurricane-force winds in Europe, and a vast patchwork of record droughts and floods. Climate modelers had predicted an uptick in intense weather as a response to global warming but could not forecast exactly where and when anomalies would hit, explains Jay Lawrimore, chief of climate monitoring at NOAA's National Climatic Data Center. What's next? Likely more of the same, says researcher Kevin Trenberth of the National Center for Atmospheric Research. "But it will move around: Droughts will move, flooding will move, where storms hit will change. But they will occur." —Larry O'Hanlon

In October 2007 one rain-swollen river displaced half a million Chinese.

FIERCE YEAR *Extreme events, November 2006 to October 2007*



FLOODS Africa: Hundreds of thousands fled rising rivers. England: soggiest year since 1766. India: Monsoon rains doubled.



HEAT WAVES Swelter claimed over 50 U.S. lives and hundreds in eastern Europe. Southern Asia's torrid spring killed more than 200.



STORMS Winds of 170 miles an hour ripped through Europe. Cyclone Gonu was the Arabian Sea's first Category 4 hurricane.



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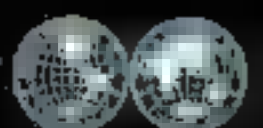
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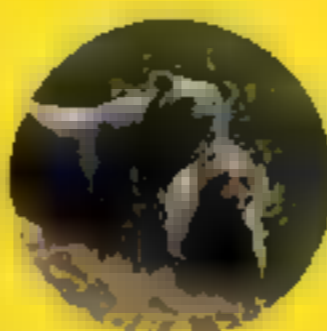


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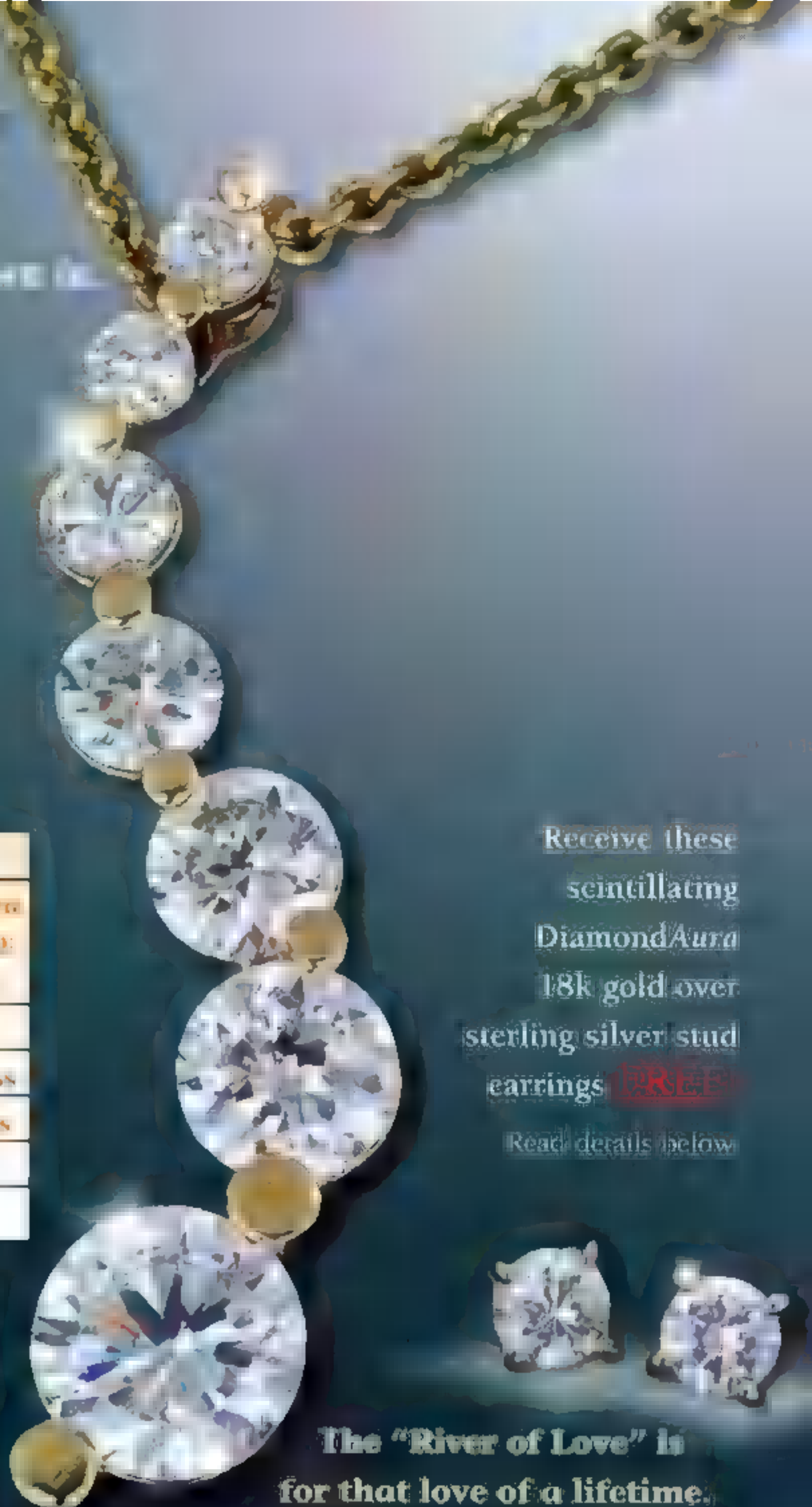
In every great fairy tale, the sorcerers take a little science and throw in a little magic to create the perfect brew that brings two lovers together. Romance is all about chemistry and these seven brilliant stones can add just the right magical fire to raise the temperature of your secret potion. In today's most important design called the "River of Love", this pendant of 2 carats t.w. of graduated DiamondAura stones is the perfect blend of science and sorcery. Our

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Color	"D" Colorless	"D" Colorless
Clarity	"IF"	"F" Faultless
Dispersion/Fire	0.044	0.066
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At the Lake of the Moon, National Geographic Explorer-in-Residence Johan Reinhard finds a wooden scepter like the one in a 16th-century illustration of Tlaloc, the Aztec rain god.

Rainmakers Archaeologists have struck lightning in a Mexican volcanic lake: Their dives in frigid water at an elevation of 13,832 feet turned up eight wooden scepters shaped like bolts from the sky, likely used to sway the Aztec rain god, Tlaloc. After the Spanish conquest in the early 1500s, colonial historians wrote of local efforts to get more rain—or a break from too much. Now, in the first archaeological study of the two sacred lakes in the Nevado de Toluca crater, a team led by Pilar Luna Erreguerena of the National Institute of Anthropology and History has uncovered artifacts that match the Spanish reports: the scepters, incense shaped into balls and cones, and spines from the maguey plant, probably used to draw sacrificial blood from tongues, earlobes, and penises. Future work may yet reveal evidence of the most tragic ritual, the sacrifice of children. —A. R. Williams





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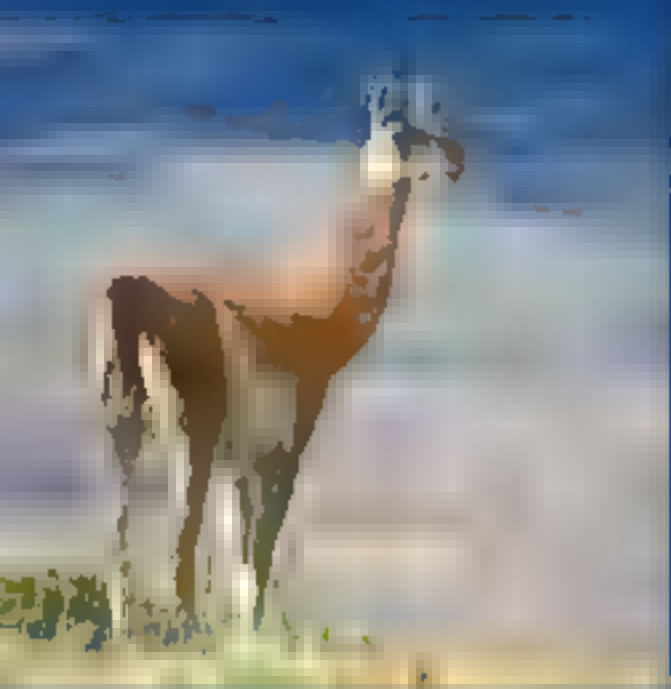
Innovation and industry have come together in an unprecedented ecological alliance. Goldman Sachs has partnered with the Wildlife Conservation Society (WCS) and the people of Chile to create a reserve of over 700,000 acres on the island of Tierra del Fuego. This public-private partnership is as unique as the land it protects and serves as a brand-new model for conservation—in Patagonia and the world over.

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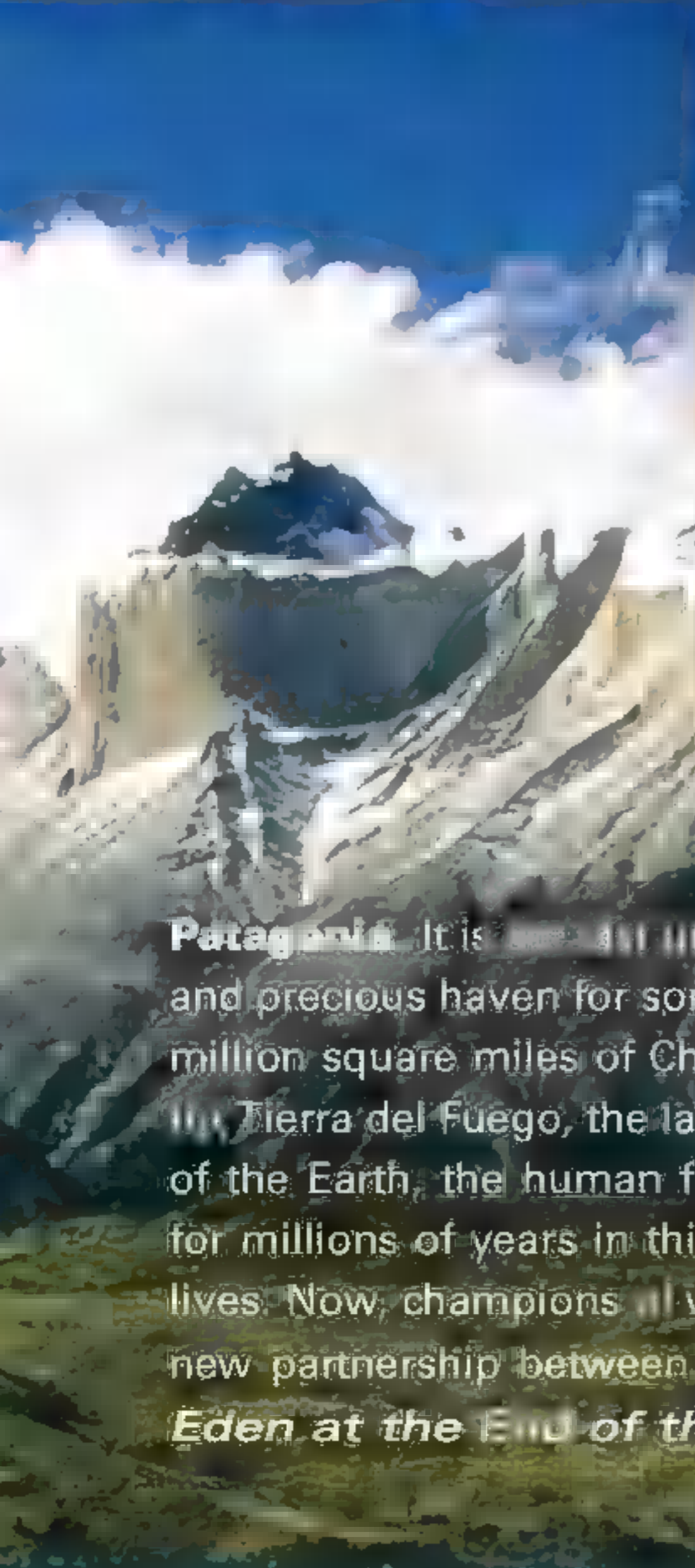
Eden at the End of the World

gives us a rare glimpse inside this historical haven for wildlife where conservationists are striving to protect these amazing creatures. Here are just some of the things you'll see in this special television premiere:

- Witness the birth of a guanaco, a rarely seen member of the camel species, whose numbers have dropped by 95%. Once in the tens of millions, they now number about 500,000.
- Watch one of the largest flying birds in the world, the Andean condor, take flight.
- See "beach masters," the most powerful male elephant seals, do battle.
- Learn about the largest colony of parrots in the world, a cave-dwelling species that numbers near 70,000.



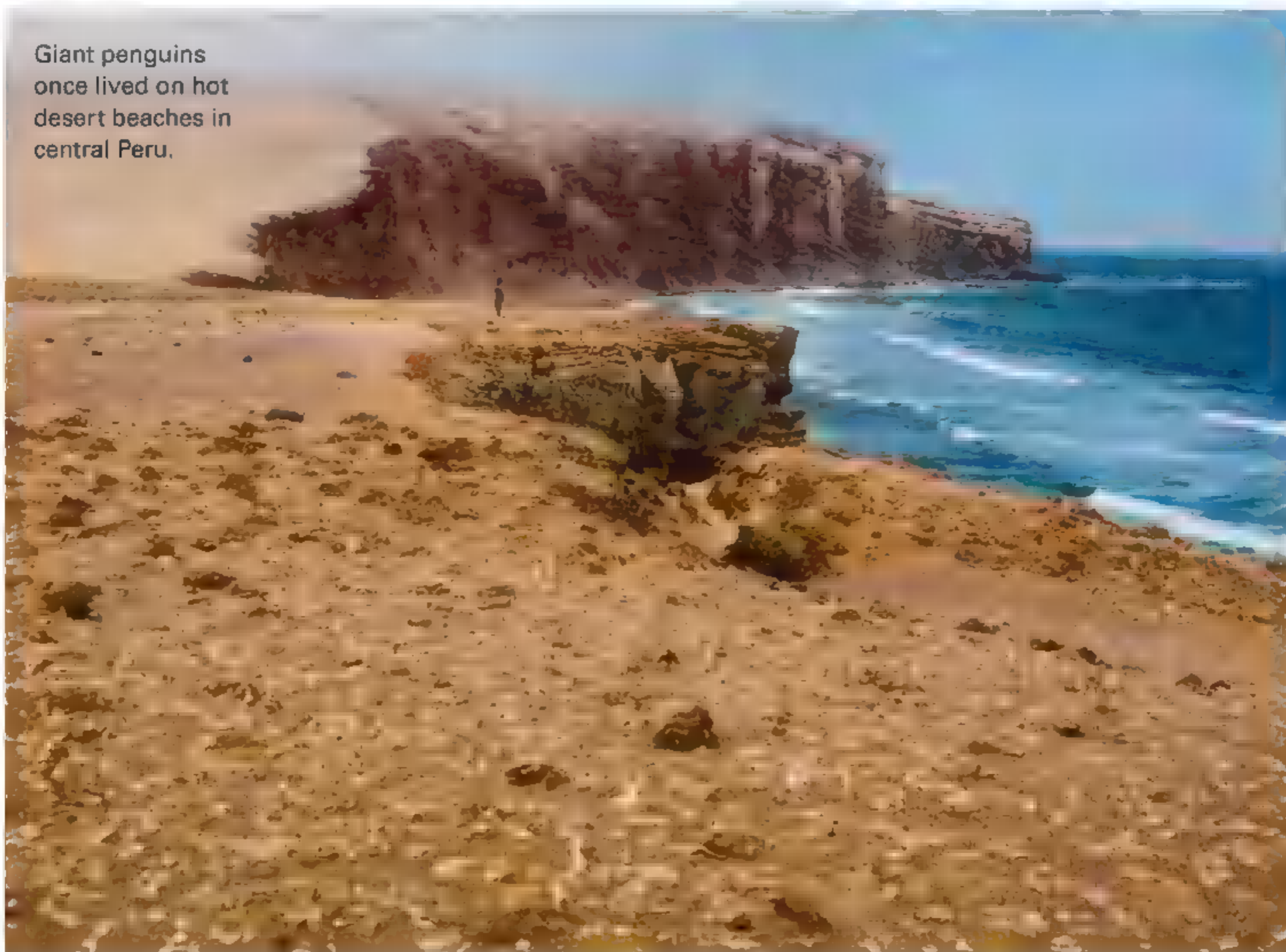
- Take a look inside the life and mating rituals of Magellanic penguins.
- See orcas launch a spectacular ambush on their prey.



Patagonia It is the most beautiful wilderness of its kind. Carved by powerful geologic forces, it is a rare and precious haven for some of Earth's most indestructible creatures. Covering more than 1.5 million square miles of Chile and Argentina, this wild place is known as Patagonia. At its crown is the Tierra del Fuego, the land of fire. But there is trouble in this stark paradise—for even at the ends of the Earth, the human footprint has left its indelible mark. And the animals that have endured for millions of years in this realm of endless, punishing winds face the greatest challenge of their lives. Now, champions of wildlife are fanning out across this spectacular place, and a revolutionary new partnership between business and conservation points the way to a future of hope for this *Eden at the End of the World*.

F O S S I L S

Giant penguins once lived on hot desert beaches in central Peru.

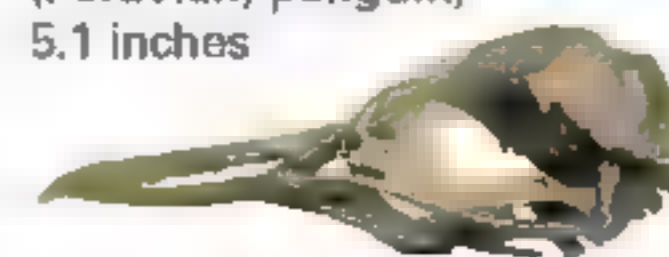


NG GRANTEE Hot Penguin It had the neck of a wrestler, a beak like a javelin, and it stood five feet tall—larger than any living penguin. But it wasn't the bird's bizarre features that first caught paleontologist Julia Clarke's eye. It was where it waddled: not in frozen wastes but in sun-bleached tropics. The fossil penguin, called *Icadyptes salasi*, lived some 36 million years ago in what is now Peru, at a time when the Earth was far hotter and before permanent polar ice caps formed. In 2005 near the city of Ica, Peruvian scientists discovered *Icadyptes* and another big penguin from 42 million years ago. Clarke and her Peruvian collaborators were the first to describe the two species, in a paper last summer. "They looked different from anything we've seen," she says. "They really shake up notions about early penguins." Dominant theories have held that penguins evolved in cold habitats near the South Pole and migrated to equatorial regions ten million years ago during a cooler period. Clarke's work shows penguins arrived far earlier and didn't wait for chillier weather. "Clearly these penguins did just fine in hot temperatures." —Neil Shea



Icadyptes salasi,
12 inches

Modern Humboldt
(Peruvian) penguin,
5.1 inches



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An aerial photograph of an offshore wind farm. The image shows several white wind turbines with three blades each, spaced out across a dark blue, choppy sea. In the upper-middle part of the image, a white service vessel with a yellow and red stripe is moving through the water, leaving a white wake. The overall scene is captured from a high angle, looking down at the turbines and the vessel.

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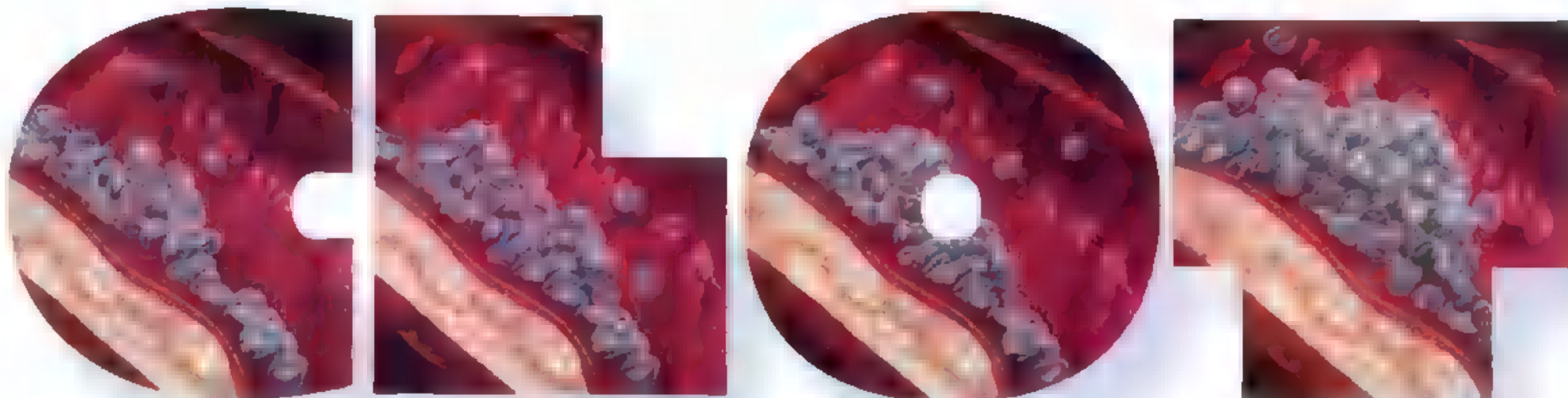
Superherbicide glyphosate couldn't kill this horseweed (at left) found among soybeans (right) in a Nebraska field.

Revenge of the Weeds The farm of the future has hit a bump in the field. In the 1970s the superherbicide glyphosate was introduced for use at the start of the growing season. First marketed as Roundup, the so-called "herbicide of the century" was safe and effective. Over time, it became cheap. In the '90s came glyphosate-resistant crops: corn, cotton, and soybeans genetically modified to survive repeat sprayings. Farmers flocked to the seeds. They didn't even need to turn over soil to control weeds. This no-till farming saved time and money and also prevented erosion.

So what went wrong? Individual weeds in certain species had genetic mutations that allowed them to resist Roundup. They survived and flourished. The first resistant weed species showed up in Australia in 1996. Four years later, glyphosate-resistant horseweed popped up in Delaware soybean fields, quickly spreading west. Other weeds have followed. Now about a dozen species shrug off applications of glyphosate—and more are expected. In Argentina, Brazil, and the U.S., plant pests tower over cotton, soybeans, and some corn, blocking sunlight and sucking water and nutrients out of the soil. Experts say the best fixes are from the farm of the past: Rotate in other crops, use different herbicides, and break out the plow. —Karen E. Lange

The worst offenders among glyphosate-resistant weeds:

- **Horseweed/mare's tail**
Covers the most U.S. acreage. In Ohio it's resistant to one other herbicide.
- **Common water hemp**
Grows up to seven feet—taller than soybeans and some corn plants.
- **Giant ragweed**
Can reach 15 feet. Found in Indiana, Kansas, and Ohio.
- **Johnsongrass**
The resistant strain is in Argentina; U.S. farmers, who rely greatly on glyphosate to kill the weed, fear it will spread.

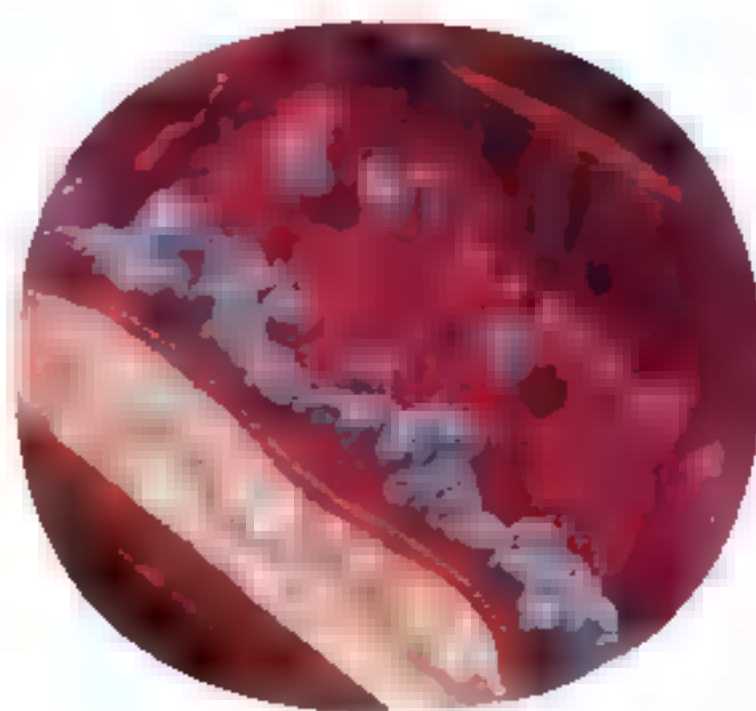


You can help protect against the formation of clots and reduce your risk of a future heart attack or stroke.

This is important information if you've been hospitalized with heart-related chest pain or had a heart attack. That's because these conditions, known as Acute Coronary Syndrome—or ACS—are usually caused when blood platelets stick together and form clots that block blood flow to your heart. And if you've already had a clot, you're at an increased risk for a future heart attack or stroke.

PLAVIX, taken with other heart medicines, helps provide greater protection against heart attack or stroke than other heart

medicines alone. That's because prescription PLAVIX works differently than your cholesterol and blood pressure medications, focusing on your blood platelets to help keep them from sticking together and forming clots.



IMPORTANT INFORMATION: If you have a stomach ulcer or other condition that causes bleeding, you should not use PLAVIX. When taking PLAVIX alone or with some other medicines including aspirin, the risk of bleeding may increase so tell your doctor before planning surgery. And, always talk to your doctor before taking aspirin or other medicines with PLAVIX, especially if you've had a stroke. If you develop fever, unexplained weakness or confusion, tell your doctor promptly as these may be signs of a rare but potentially life-threatening condition called TTP, which has been reported rarely, sometimes in less than 2 weeks after starting therapy. Other rare but serious side effects may occur.

See important product information on the following page.

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WHO IS PLAVIX FOR?

PLAVIX is a prescription-only medicine that helps keep blood platelets from sticking together and forming clots.

PLAVIX is for patients who have:

- had a recent heart attack.
- had a recent stroke.
- poor circulation in their legs (Peripheral Artery Disease).

PLAVIX in combination with aspirin is for patients hospitalized with:

- heart-related chest pain (unstable angina).
- heart attack.

Doctors may refer to these conditions as ACS (Acute Coronary Syndrome).

Clots can become dangerous when they form inside your arteries. These clots form when blood platelets stick together, forming a blockage within your arteries, restricting blood flow to your heart or brain, causing a heart attack or stroke.

WHO SHOULD NOT TAKE PLAVIX?

You should NOT take PLAVIX if you:

- are allergic to clopidogrel (the active ingredient in PLAVIX).
- have a stomach ulcer
- have another condition that causes bleeding.
- are pregnant or may become pregnant.
- are breast feeding.

WHAT SHOULD I TELL MY DOCTOR BEFORE TAKING PLAVIX?

Before taking PLAVIX, tell your doctor if you're pregnant or are breast feeding or have any of the following:

- gastrointestinal ulcer
- stomach ulcer(s)
- liver problems
- kidney problems
- a history of bleeding conditions

WHAT IMPORTANT INFORMATION SHOULD I KNOW ABOUT PLAVIX?

TTP: A very serious blood condition called TTP (Thrombotic Thrombocytopenic Purpura) has been rarely reported in people taking PLAVIX. TTP is a potentially life-threatening condition that involves low blood platelet and red blood cell levels, and requires urgent referral to a specialist for prompt treatment once a diagnosis is suspected. Warning signs of TTP may include fever, unexplained confusion or weakness (due to a low blood count, what doctors call anemia). To make an accurate diagnosis, your doctor will need to order blood tests. TTP has been reported rarely, sometimes in less than 2 weeks after starting therapy.

Gastrointestinal Bleeding: There is a potential risk of gastrointestinal (stomach and intestine) bleeding when taking PLAVIX. PLAVIX should be used with caution in patients who have lesions that may bleed (such as ulcers), along with patients who take drugs that cause such lesions.

Bleeding: You may bleed more easily and it may take you longer than usual to stop bleeding when you take PLAVIX alone or in combination with aspirin. Report any unusual bleeding to your doctor.

Geriatrics: When taking aspirin with PLAVIX the risk of serious bleeding increases with age in patients 65 and over.

Stroke Patients: If you have had a recent TIA (also known as a mini-stroke) or stroke taking aspirin with PLAVIX has not been shown to be more effective than taking PLAVIX alone, but taking aspirin with PLAVIX has been shown to increase the risk of bleeding compared to taking PLAVIX alone.

Surgery: Inform doctors and dentists well in advance of any surgery that you are taking PLAVIX so they can help you decide whether or not to discontinue your PLAVIX treatment prior to surgery.

WHAT SHOULD I KNOW ABOUT TAKING OTHER MEDICINES WITH PLAVIX?

You should only take aspirin with PLAVIX when directed to do so by your doctor. Certain other medicines should not be taken with PLAVIX. Be sure to tell your doctor about all of your current medications, especially if you are taking the following:

- aspirin
- nonsteroidal anti-inflammatory drugs (NSAIDs)
- warfarin
- heparin

Be sure to tell your doctor if you are taking PLAVIX before starting any new medication.

WHAT ARE THE COMMON SIDE EFFECTS OF PLAVIX?

The most common side effects of PLAVIX include gastrointestinal events (bleeding, abdominal pain, indigestion, diarrhea, and nausea) and rash. This is not a complete list of side effects associated with PLAVIX. Ask your doctor or pharmacist for a complete list.

HOW SHOULD I TAKE PLAVIX?

Only take PLAVIX exactly as prescribed by your doctor. Do not change your dose or stop taking PLAVIX without talking to your doctor first.

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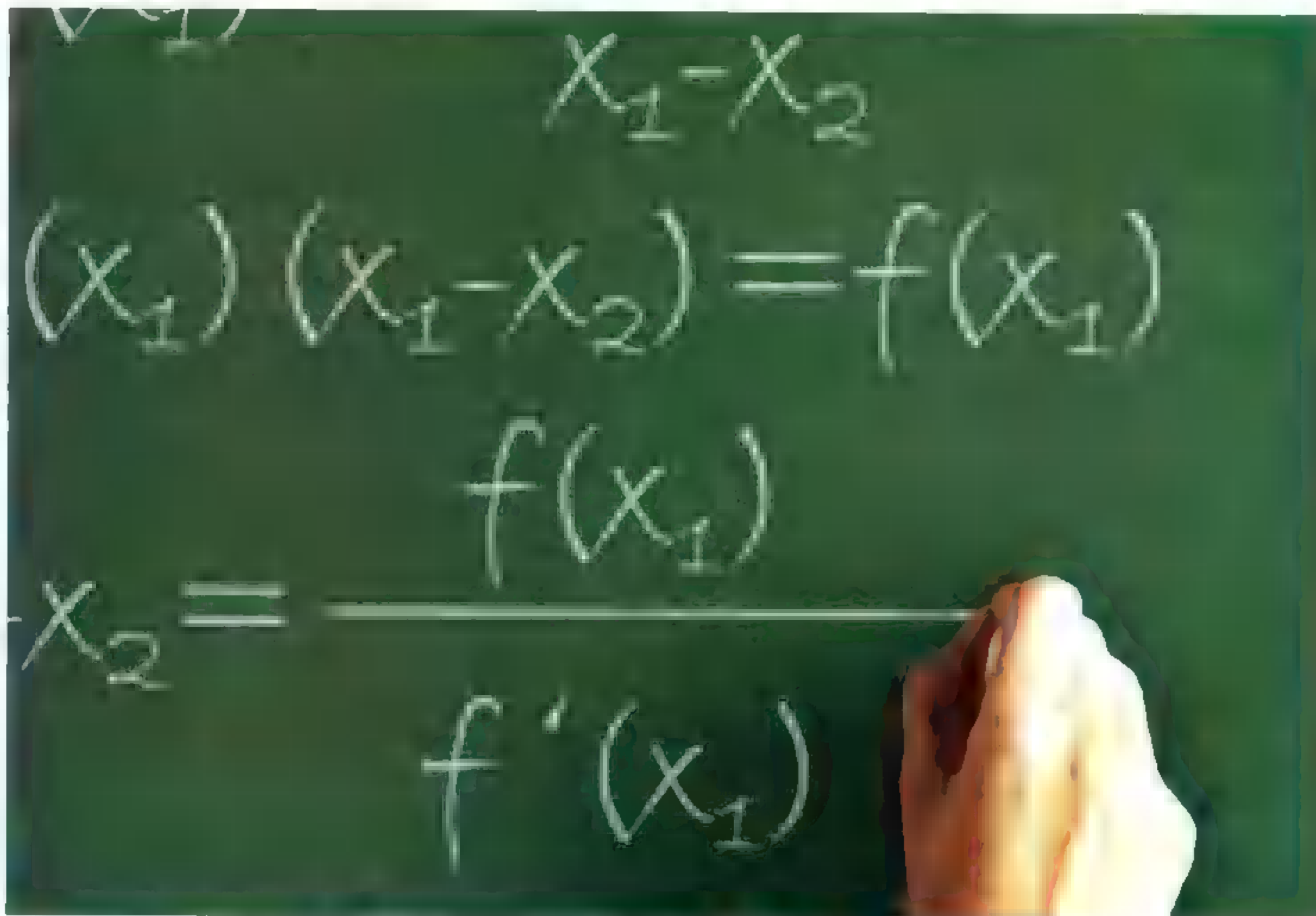
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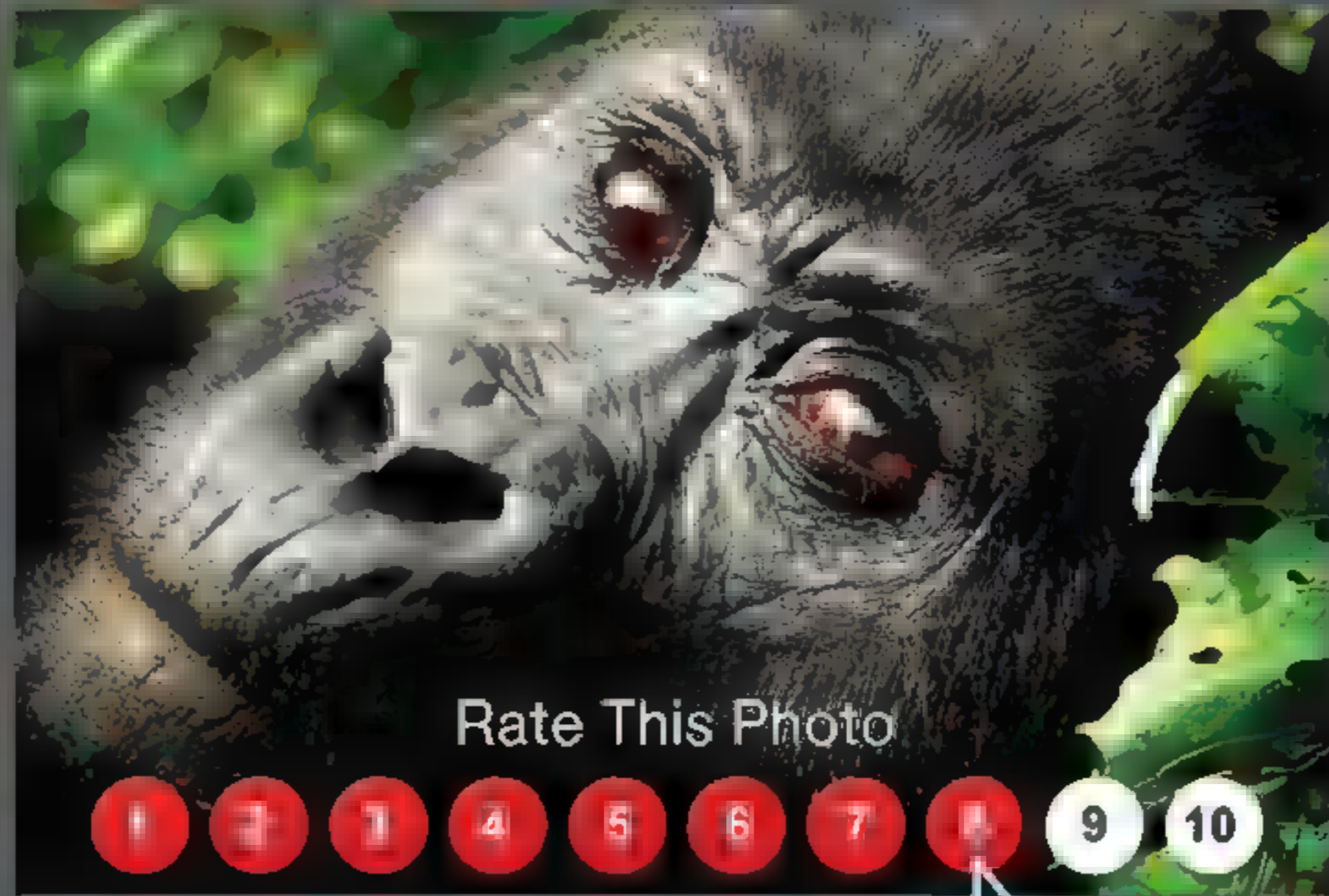
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 NATIONAL
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WHERE IN THE WORLD?



Nahalal, a farming community in Israel's Jezreel Valley, is rooted in a very old master plan.

Full Circle When the founders of Nahalal established this farming community in Palestine in 1921, they envisioned a cooperative that would radiate their highest ideals. At its center would be shared public buildings, barns, and supply sheds, girded by a ring of private residences, all surrounded by farmland. While concentric layouts are hardly new—centuries ago, many villages had a radial orientation for security reasons—Nahalal also reflects its founders' egalitarianism: Living in a circle, all residents would enjoy equal access to the facilities and to their neighbors. Today Nahalal (Hebrew for "pasture") is home to roughly 750 people, many of whom work here producing everything from chicken to olives to grapefruit. But the cooperative spirit largely dissipated when families began marketing their own goods in the 1990s. One structural kink of this design: Growth is limited. Once a rigid circle is drawn, there's little room to go forth and multiply. —Alan Mairson

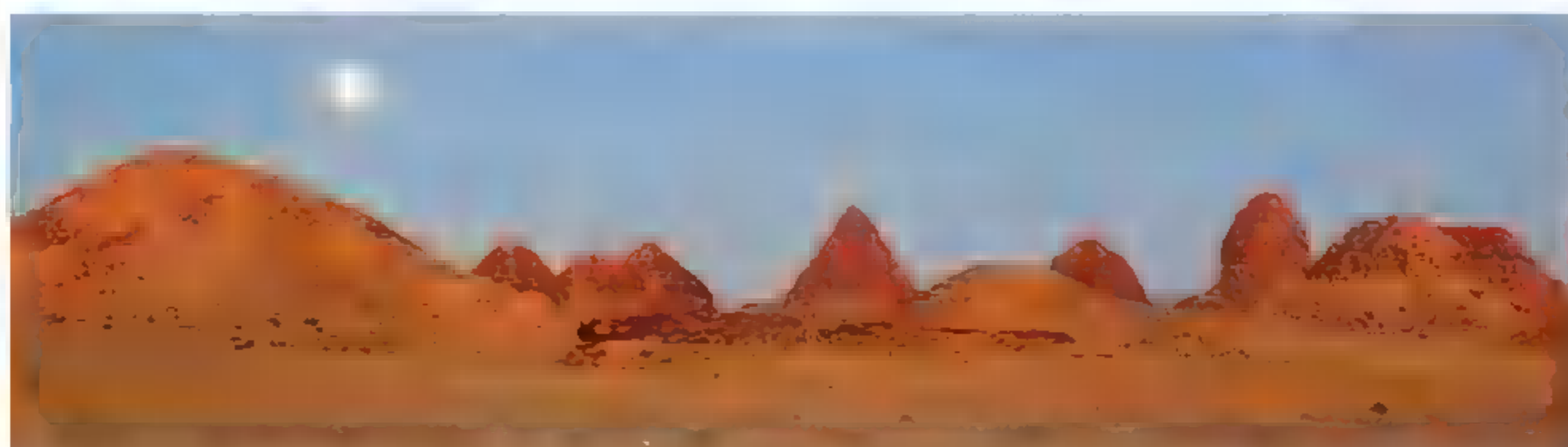


AN IGNORED CHAPTER OF HISTORY
TELLS OF A TIME WHEN KINGS FROM DEEP IN
AFRICA
CONQUERED ANCIENT
EGYPT

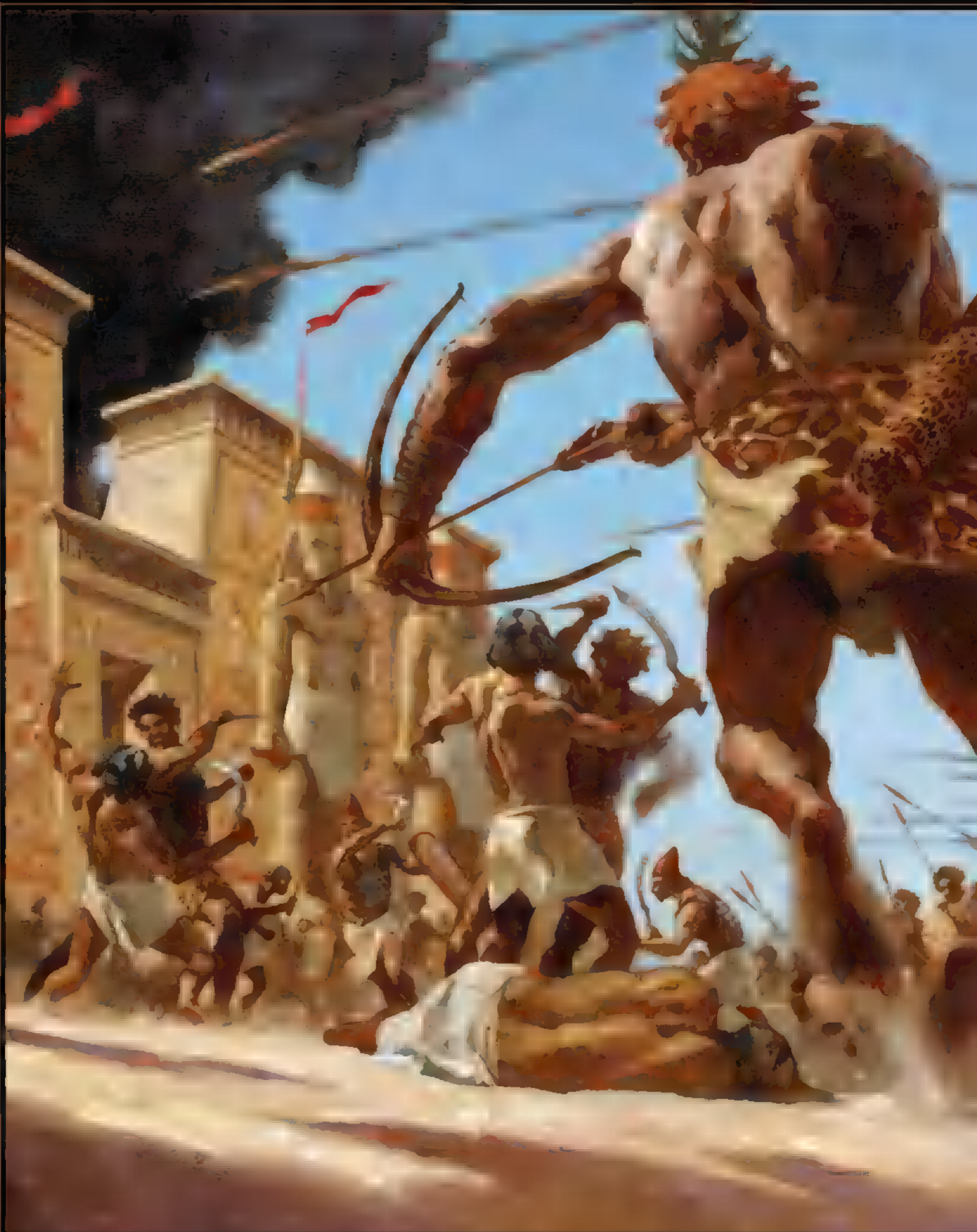
Black Pharaohs

BY ROBERT DRAPER
NATIONAL GEOGRAPHIC CONTRIBUTING WRITER

PHOTOGRAPHS BY KENNETH GARRETT



Nubian pharaoh Taharqa (left) was buried in an Egyptian-style pyramid (above, left) in Sudan.



After capturing city after city along the Nile River in 730 B.C., troops commanded by King Piye of Nubia storm the great walled capital of Memphis with flaming arrows. Piye modeled himself after



powerful pharaohs such as Ramses II (statues), claiming to be the rightful ruler of Egypt. His triumph over the northern chiefs would unite all Egypt under Nubian rule for three-quarters of a century.

IN THE YEAR 730 B.C., a man by the name of Piye decided the only way to save Egypt from itself was to invade it. Things would get bloody before the salvation came.

“Harness the best steeds of your stable,” he ordered his commanders. The magnificent civilization that had built the great pyramids had lost its way, torn apart by petty warlords. For two decades Piye had ruled over his own kingdom in Nubia, a swath of Africa located mostly in present-day Sudan. But he considered himself the true ruler of Egypt as well, the rightful heir to the spiritual

traditions practiced by pharaohs such as Ramses II and Thutmose III. Since Piye had probably never actually visited Lower Egypt, some did not take his boast seriously. Now Piye would witness the subjugation of decadent Egypt firsthand—“I shall let Lower Egypt taste the taste of my fingers,” he would later write.

North on the Nile River his soldiers sailed. At Thebes, the capital of Upper Egypt, they disembarked. Believing there was a proper way to wage holy wars, Piye instructed his soldiers to purify themselves before combat by bathing in the Nile, dressing themselves in fine linen, and sprinkling their bodies with water from the temple at Karnak, a site holy to the ram-headed sun god Amun, whom Piye identified as his own personal deity. Piye himself feasted and offered sacrifices to Amun. Thus sanctified, the commander and his men commenced to do battle with every army in their path.

By the end of a yearlong campaign, every leader in Egypt had capitulated—including the powerful delta warlord Tefnakht, who sent a messenger to tell Piye, “Be gracious! I cannot see your face in the days of shame; I cannot stand before your flame, I dread your grandeur.”

Robert Draper is the author of Dead Certain: The Presidency of George W. Bush. He recently wrote for National Geographic about 21st-century cowboys. Kenneth Garrett shot the August 2007 National Geographic feature on the Maya civilization.

In exchange for their lives, the vanquished urged Piye to worship at their temples, pocket their finest jewels, and claim their best horses. He obliged them. And then, with his vassals trembling before him, the newly anointed Lord of the Two Lands did something extraordinary: He loaded up his army and his war booty, and sailed southward to his home in Nubia, never to return to Egypt again.

When Piye died at the end of his 35-year reign in 715 B.C., his subjects honored his wishes by burying him in an Egyptian-style pyramid, with four of his beloved horses nearby. He was the first pharaoh to receive such entombment in more than 500 years. A pity, then, that the great Nubian who accomplished these feats is literally faceless to us. Images of Piye on the elaborate granite slabs, or stelae, memorializing his conquest of Egypt have long since been chiseled away. On a relief in the temple at the Nubian capital of Napata, only Piye’s legs remain. We are left with a single physical detail of the man—namely, that his skin was dark.

Piye was the first of the so-called black pharaohs—a series of Nubian kings who ruled over all of Egypt for three-quarters of a century as that country’s 25th dynasty. Through inscriptions carved on stelae by both the Nubians and their enemies, it is possible to map out these rulers’ vast footprint on the continent. The black pharaohs reunified a tattered Egypt and filled its landscape with glorious monuments,

creating an empire that stretched from the southern border at present-day Khartoum all the way north to the Mediterranean Sea. They stood up to the bloodthirsty Assyrians, perhaps saving Jerusalem in the process.

Until recently, theirs was a chapter of history that largely went untold. Only in the past four decades have archaeologists resurrected their story—and come to recognize that the black pharaohs didn't appear out of nowhere. They sprang from a robust African civilization that had flourished on the southern banks of the Nile for 2,500 years, going back at least as far as the first Egyptian dynasty.

Today Sudan's pyramids—greater in number than all of Egypt's—are haunting spectacles in the Nubian Desert. It is possible to wander among them unharassed, even alone, a world away from Sudan's genocide and refugee crisis in Darfur or the aftermath of civil war in the south. While hundreds of miles north, at Cairo or Luxor, curiosity seekers arrive by the busload to jostle and crane for views of the Egyptian wonders, Sudan's seldom-visited pyramids at El Kurru, Nuri, and Meroë stand serenely amid an arid landscape that scarcely hints of the thriving culture of ancient Nubia.

Now our understanding of this civilization is once again threatened with obscurity. The Sudanese government is building a hydroelectric dam along the Nile, 600 miles upstream from the Aswan High Dam, which Egypt constructed in the 1960s, consigning much of lower Nubia to the bottom of Lake Nasser (called Lake Nubia in Sudan). By 2009, the massive Merowe Dam should be complete, and a 106-mile-long lake will flood the terrain abutting the Nile's Fourth Cataract, or rapid, including thousands of unexplored sites. For the past nine years, archaeologists have flocked to the region, furiously digging before another repository of Nubian history goes the way of Atlantis.

THE ANCIENT WORLD was devoid of racism. At the time of Piye's historic conquest, the fact that his skin was dark was irrelevant. Artwork from ancient Egypt, Greece, and Rome shows a clear

awareness of racial features and skin tone, but there is little evidence that darker skin was seen as a sign of inferiority. Only after the European powers colonized Africa in the 19th century did Western scholars pay attention to the color of the Nubians' skin, to uncharitable effect.

Explorers who arrived at the central stretch of the Nile River excitedly reported the discovery of elegant temples and pyramids—the ruins of an ancient civilization called Kush. Some, like the Italian doctor Giuseppe Ferlini—who lopped off the top of at least one Nubian pyramid, inspiring others to do the same—hoped to find treasure beneath. The Prussian archaeologist Richard Lepsius had more studious intentions, but he ended up doing damage of his own by concluding that the Kushites surely “belonged to the Caucasian race.”

Even famed Harvard Egyptologist George Reisner—whose discoveries between 1916 and 1919 offered the first archaeological evidence of Nubian kings who ruled over Egypt—besmirched his own findings by insisting that

Likely an Egyptian gift to King Piye, a quartz amulet found at the cemetery of El Kurru is crowned by a golden goddess.



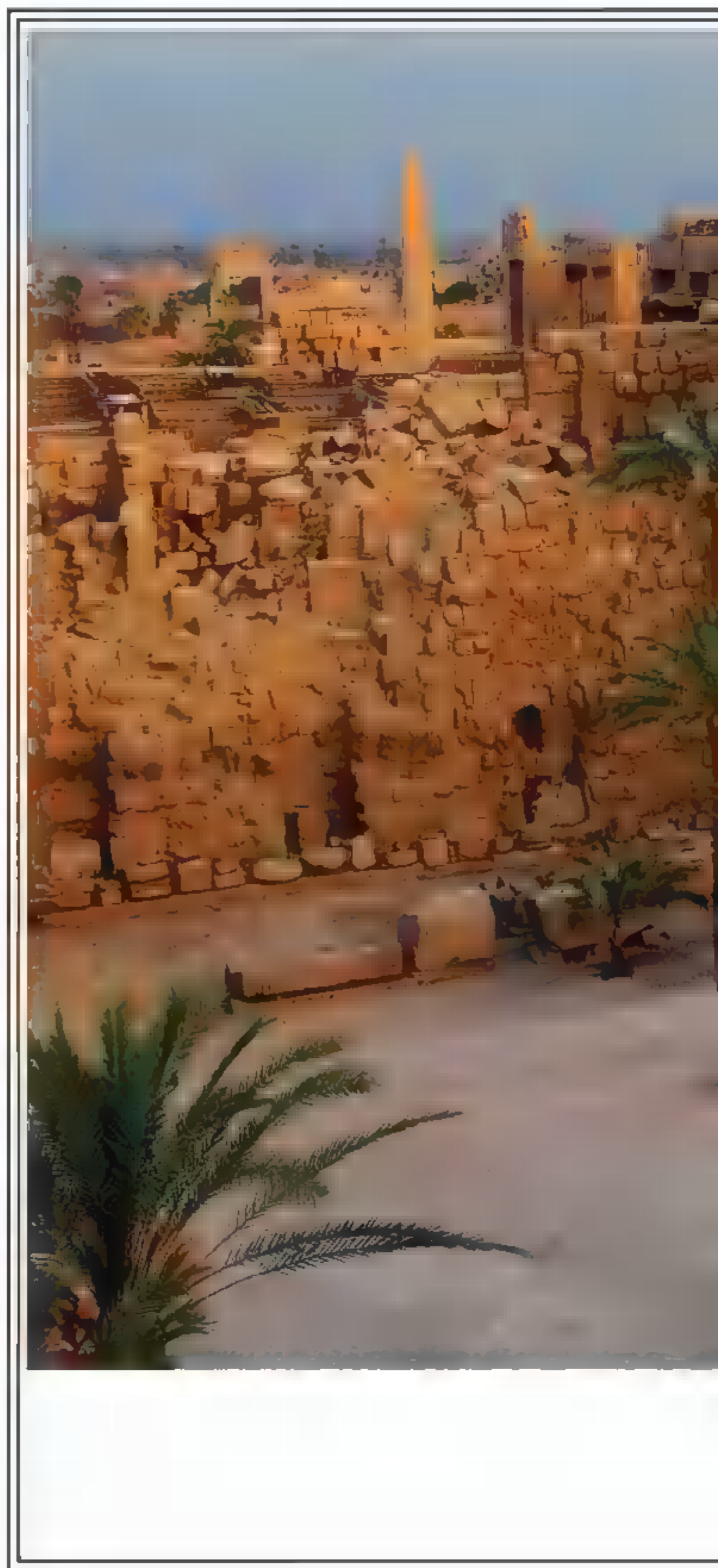
black Africans could not possibly have constructed the monuments he was excavating. He believed that Nubia's leaders, including Piye, were light-skinned Egypto-Libyans who ruled over the primitive Africans. That their moment of greatness was so fleeting, he suggested, must be a consequence of the same leaders intermarrying with the "negroid elements."

For decades, many historians flip-flopped: Either the Kushite pharaohs were actually "white," or they were bumbling, their civilization a derivative offshoot of true Egyptian culture. In their 1942 history, *When Egypt Ruled the East*, highly regarded Egyptologists Keith Seele and George Steindorff summarized the Nubian pharaonic dynasty and Piye's triumphs in all of three sentences—the last one reading: "But his dominion was not for long."

The neglect of Nubian history reflected not only the bigoted worldview of the times, but also a cult-like fascination with Egypt's achievements—and a complete ignorance of Africa's past. "The first time I came to Sudan," recalls Swiss archaeologist Charles Bonnet, "people said: 'You're mad! There's no history there! It's all in Egypt!'"

That was a mere 44 years ago. Artifacts uncovered during the archaeological salvage campaigns as the waters rose at Aswan in the 1960s began changing that view. In 2003, Charles Bonnet's decades of digging near the Nile's Third Cataract at the abandoned settlement of Kerma gained international recognition with the discovery of seven large stone statues of Nubian pharaohs. Well before then, however, Bonnet's labors had revealed an older, densely occupied urban center that commanded rich fields and extensive herds, and had long profited from trade in gold, ebony, and ivory. "It was a kingdom completely free of Egypt and original, with its own construction and burial customs," Bonnet says. This powerful dynasty rose just as Egypt's Middle Kingdom declined around 1785 B.C. By 1500 B.C. the Nubian empire stretched between the Second and Fifth Cataracts.

Revisiting that golden age in the African desert does little to advance the case of Afrocentric Egyptologists, who argue that all





The ruins of columns, along with one restored to its full height, mark the entrance porch that King Taharqa added to the Great Temple of Amun at Karnak, one of ancient Egypt's most sacred sites.



HE ANCIENT WORLD WAS DEVOID OF RACISM. AT THE TIME OF PIYE'S HISTORIC CONQUEST OF EGYPT, THE FACT THAT HIS SKIN WAS DARK WAS IRRELEVANT.



KERMA MUSEUM, NATIONAL CORPORATION FOR ANTIQUITIES AND MUSEUMS, SUDAN

Statues of Nubian kings up to ten feet high were found buried at the Nubian capital of Kerma, in Sudan. Smashed during Egyptian King Psamtek II's incursion south around 593 B.C., they were recently reassembled.



ancient Egyptians, from King Tut to Cleopatra, were black Africans. Nonetheless, the saga of the Nubians proves that a civilization from deep in Africa not only thrived but briefly dominated in ancient times, intermingling and sometimes intermarrying with their Egyptian neighbors to the north. (King Tut's own grandmother, the 18th-dynasty Queen Tiye, is claimed by some to be of Nubian heritage.)

The Egyptians didn't like having such a powerful neighbor to the south, especially since they depended on Nubia's gold mines to bankroll their dominance of western Asia. So the pharaohs of the 18th dynasty (1539-1292 B.C.) sent armies to conquer Nubia and built garrisons along the Nile. They installed Nubian chiefs as administrators and schooled the children of favored Nubians at Thebes. Subjugated, the elite Nubians began to embrace the cultural and spiritual customs of Egypt—venerating Egyptian gods, particularly Amun, using the Egyptian language, adopting Egyptian burial styles and, later, pyramid building. The Nubians were arguably the first people to be struck by "Egyptomania."

Egyptologists of the latter 19th and early 20th centuries would interpret this as a sign of weakness. But they had it wrong: The Nubians had a gift for reading the geopolitical tea leaves. By the eighth century B.C., Egypt was riven by factions, the north ruled by Libyan chiefs who put on the trappings of pharaonic traditions to gain legitimacy. Once firmly in power, they toned down the theocratic devotion to Amun, and the priests at Karnak feared a godless outcome. Who was in a position to return Egypt to its former state of might and sanctity?

The Egyptian priests looked south and found their answer—a people who, without setting foot inside Egypt, had preserved Egypt's spiritual traditions. As archaeologist Timothy Kendall of Northeastern University puts it, the Nubians "had become more Catholic than the pope."

UNDER NUBIAN RULE, Egypt became Egypt again. When Piye died in 715, his brother Shabaka solidified the 25th dynasty by taking up

residence in the Egyptian capital of Memphis. Like his brother, Shabaka wed himself to the old pharaonic ways, adopting the throne name of the 6th-dynasty ruler Pepi II, just as Piye had claimed the old throne name of Thutmose III. Rather than execute his foes, Shabaka put them to work building dikes to seal off Egyptian villages from Nile floods.

Shabaka lavished Thebes and the Temple of Luxor with building projects. At Karnak he erected a pink granite statue depicting himself wearing the Kushite crown of the double uraeus—the two cobras signifying his legitimacy as Lord of the Two Lands. Through architecture as well as military might, Shabaka signaled to Egypt that the Nubians were here to stay.

To the east, the Assyrians were fast building their own empire. In 701 B.C., when they marched into Judah in present-day Israel, the Nubians decided to act. At the city of Eltekeh, the two armies met. And although the Assyrian emperor, Sennacherib, would brag lustily that he "inflicted defeat upon them," a young

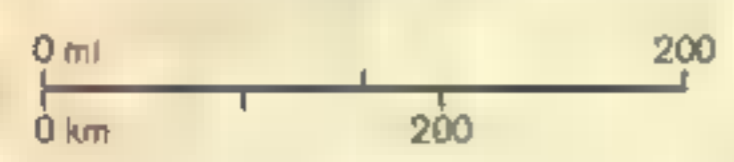
An indigenous Nubian cattle-herding culture created this female clay figurine, now headless, in about 1700 B.C.



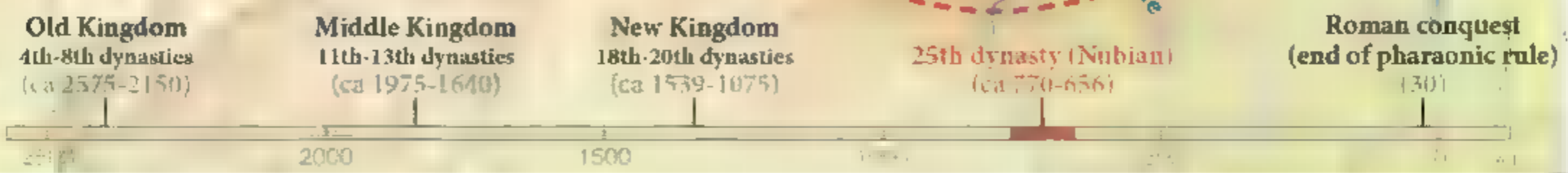
EGYPT AND NUBIA—NEIGHBORS AND RIVALS

After exploiting Nubia's gold since at least 2000 B.C., Egypt conquered its southern neighbor, also known as Kush, during the New Kingdom. When political turmoil later gripped Egypt, the Nubians marched in and ruled—until the Assyrians pushed them back south in the seventh century B.C.

- ▲ Ruin
- Extent of Egyptian empire during New Kingdom
- - - Extent of Kushite (Nubian) empire during 25th dynasty
- Kushite heartland
- Traditional boundary between Egypt and Nubia



RELIEF BY THOMAS CLAYTON
 JEROME N. COOKSON AND LISA R. BIFTER, NGM MAPS





At the height of his power, King Taharqa leads his queens through the crowds during a festival at the temple complex of Nubia's Jebel Barkal, its pinnacle gleaming with gold. Accompanied by sacred



ship bearing an image of the god Amun, Taharqa is robed in a priestly leopard skin and crowned with the double uraeus that declares him Lord of the Two Lands—ruler of both Nubia and Egypt.

Nubian prince, perhaps 20, son of the great pharaoh Piye, managed to survive. That the Assyrians, whose tastes ran to wholesale slaughter, failed to kill the prince suggests their victory was anything but total.

In any event, when the Assyrians left town and massed against the gates of Jerusalem, that city's embattled leader, Hezekiah, hoped his Egyptian allies would come to the rescue. The Assyrians issued a taunting reply, immortalized in the Old Testament's Book of II Kings: "Thou trustest upon the staff of this bruised reed [of] Egypt, on which if a man lean, it will go into his hand, and pierce it: So is Pharaoh king of Egypt unto all that trust on him."

Then, according to the Scriptures and other accounts, a miracle occurred: The Assyrian army retreated. Were they struck by a plague? Or, as Henry Aubin's provocative book, *The Rescue of Jerusalem*, suggests, was it actually the alarming news that the aforementioned Nubian prince was advancing on Jerusalem? All we know for sure is that Sennacherib abandoned the siege and galloped back in disgrace to his kingdom, where he was murdered 18 years later, apparently by his own sons.

The deliverance of Jerusalem is not just another of ancient history's sidelights, Aubin asserts, but one of its pivotal events. It allowed Hebrew society and Judaism to strengthen for another crucial century—by which time the Babylonian king Nebuchadrezzar could banish the Hebrew people but not obliterate them or their faith. From Judaism, of course, would spring Christianity and Islam. Jerusalem would come to be recast, in all three major monotheistic religions, as a city of a godly significance.

It has been easy to overlook, amid these towering historical events, the dark-skinned figure at the edge of the landscape—the survivor of Eltekeh, the hard-charging prince later referred to by the Assyrians as "the one accursed by all the great gods": Piye's son Taharqa.

SO SWEEPING was Taharqa's influence on Egypt that even his enemies could not eradicate his imprint. During his rule, to travel down the





Queen Kawit, shown on her sarcophagus having her hair dressed, was one of the noble women believed to have been sent from Nubia to make diplomatic marriages with 11th-dynasty pharaoh Mentuhotep II.



HE FIRST TIME ARCHAEOLOGIST CHARLES BONNET WENT TO SUDAN, PEOPLE SAID: “YOU’RE MAD! THERE’S NO HISTORY THERE! IT’S ALL IN EGYPT!”





At Jebel Barkal, Taharqa created a temple dedicated to the goddess Mut, the consort of Amun—part of a grand building campaign throughout his empire, from northern Egypt down into Nubia.



UBIANS EMBRACED THE SPIRITUAL CUSTOMS OF EGYPT. THEY WERE ARGUABLY THE FIRST PEOPLE TO BE STRUCK BY “EGYPTOMANIA.”

A lion devouring a Nubian, crafted during the 19th dynasty possibly as a fly-whisk handle, symbolizes the valiant ruler of Egypt subjugating the Nubians to protect his country and avert chaos.



Nile from Napata to Thebes was to navigate a panorama of architectural wonderment. All over Egypt, he built monuments with busts, statues, and cartouches bearing his image or name, many of which now sit in museums around the world. He is depicted as a supplicant to gods, or in the protective presence of the ram deity Amun, or as a sphinx himself, or in a warrior's posture. Most statues were defaced by his rivals. His nose is often broken off, to foreclose him returning from the dead. Shattered as well is the uraeus on his forehead, to repudiate his claim as Lord of the Two Lands. But in each remaining image, the serene self-certainty in his eyes remains for all to see.

His father, Piye, had returned the true pharaonic customs to Egypt. His uncle Shabaka had established a Nubian presence in Memphis and Thebes. But their ambitions paled before those of the 31-year-old military commander who received the crown in Memphis in 690 and presided over the combined empires of Egypt and Nubia for the next 26 years.

Taharqa had ascended at a favorable moment for the 25th dynasty. The delta warlords had been laid low. The Assyrians, after failing to best him at Jerusalem, wanted no part of the Nubian ruler. Egypt was his and his alone. The gods granted him prosperity to go with the peace. During his sixth year on the throne, the Nile swelled from rains, inundating the valleys and yielding a spectacular harvest of grain without sweeping away any villages. As Taharqa would record in four separate stela, the high waters even exterminated all rats and snakes. Clearly the revered Amun was smiling on his chosen one.

Taharqa did not intend to sit on his profits. He believed in spending his political capital. Thus he launched the most audacious building campaign of any pharaoh since the New Kingdom (around 1500 B.C.), when Egypt had been in a period of expansion. Inevitably the two holy capitals of Thebes and Napata received the bulk of Taharqa's attention. Standing today amid the hallowed clutter of the Karnak temple complex near Thebes is a lone *(Continued on page 58)*



Nubia was a major source of gold for ancient Egypt. At Thebes the tomb of King Tutankhamun's viceroy to Nubia—a man named Huy—shows Nubian royalty in procession delivering rings of gold as part of their tribute to their overlord. The skilled goldsmiths of Nubia created masterpieces such as a pendant of the goddess Isis (right) from the tomb of a Nubian king at Nuri.







Centuries after Nubia lost control of Egypt, it continued to follow its neighbor's tradition of marking royal tombs with pyramids, like these restored at Meroë. Today Sudan has more pyramids than Egypt.

62-foot-high column. That pillar had been one of ten, forming a gigantic kiosk that the Nubian pharaoh added to the Temple of Amun. He also constructed a number of chapels around the temple and erected massive statues of himself and of his beloved mother, Abar. Without defacing a single preexisting monument, Taharqa made Thebes his.

He did the same hundreds of miles upriver, in the Nubian city of Napata. Its holy mountain Jebel Barkal—known for its striking rock-face pinnacle that calls to mind a phallic symbol of fertility—had captivated even the Egyptian pharaohs of the New Kingdom, who believed the site to be the birthplace of Amun. Seeking to present himself as heir to the New Kingdom pharaohs, Taharqa erected two temples, set into the base of the mountain, honoring the goddess consorts of Amun. On Jebel Barkal's pinnacle—partially covered in gold leaf to bedazzle wayfarers—the black pharaoh ordered his name inscribed.

Around the 15th year of his rule, amid the grandiosity of his empire-building, a touch of hubris was perhaps overtaking the Nubian ruler. "Taharqa had a very strong army and was one of the main international powers of this period," says Charles Bonnet. "I think he thought he was the king of the world. He became a bit of a megalomaniac."

The timber merchants along the coast of Lebanon had been feeding Taharqa's architectural appetite with a steady supply of juniper and cedar. When the Assyrian king Esarhaddon sought to clamp down on this trade artery, Taharqa sent troops to the southern Levant to support a revolt against the Assyrian. Esarhaddon quashed the move and retaliated by crossing into Egypt in 674 B.C. But Taharqa's army beat back its foes.

The victory clearly went to the Nubian's head. Rebel states along the Mediterranean shared his giddiness and entered into an alliance against Esarhaddon. In 671 the Assyrians marched with their camels into the Sinai desert to quell the rebellion. Success was instant; now it was Esarhaddon who brimmed with bloodlust. He directed his troops toward the Nile Delta.

Taharqa and his army squared off against the

Assyrians. For 15 days they fought pitched battles—"very bloody," by Esarhaddon's grudging admission. But the Nubians were pushed back all the way to Memphis. Wounded five times, Taharqa escaped with his life and abandoned Memphis. In typical Assyrian fashion, Esarhaddon slaughtered the villagers and "erected piles of their heads." Then, as the Assyrian would later write, "His queen, his harem, Ushankhuru his heir, and the rest of his sons and daughters, his property and his goods, his horses, his cattle, his sheep, in countless numbers, I carried off to Assyria. The root of Kush I tore up out of Egypt." To commemorate Taharqa's humiliation, Esarhaddon commissioned a stela showing Taharqa's son, Ushankhuru, kneeling before the Assyrian with a rope tied around his neck.

As it happened, Taharqa outlasted the victor. In 669 Esarhaddon died en route to Egypt, after learning that the Nubian had managed to retake Memphis. Under a new king, the Assyrians once again assaulted the city, this time with an army swollen with captured rebel troops. Taharqa stood no chance. He fled south to Napata and never saw Egypt again.

A measure of Taharqa's status in Nubia is that he remained in power after being routed twice from Memphis. How he spent his final years is a mystery—with the exception of one final innovative act. Like his father, Piye, Taharqa chose to be buried in a pyramid. But he eschewed the royal cemetery at El Kurru, where all previous Kushite pharaohs had been laid to rest. Instead, he chose a site at Nuri, on the opposite bank of the Nile. Perhaps, as archaeologist Timothy Kendall has theorized, Taharqa selected the location because, from the vista of Jebel Barkal, his pyramid precisely aligns with the sunrise on ancient Egypt's New Year's Day, linking him in perpetuity with the Egyptian concept of rebirth.

Just as likely, the Nubian's motive will remain obscure, like his people's history. □

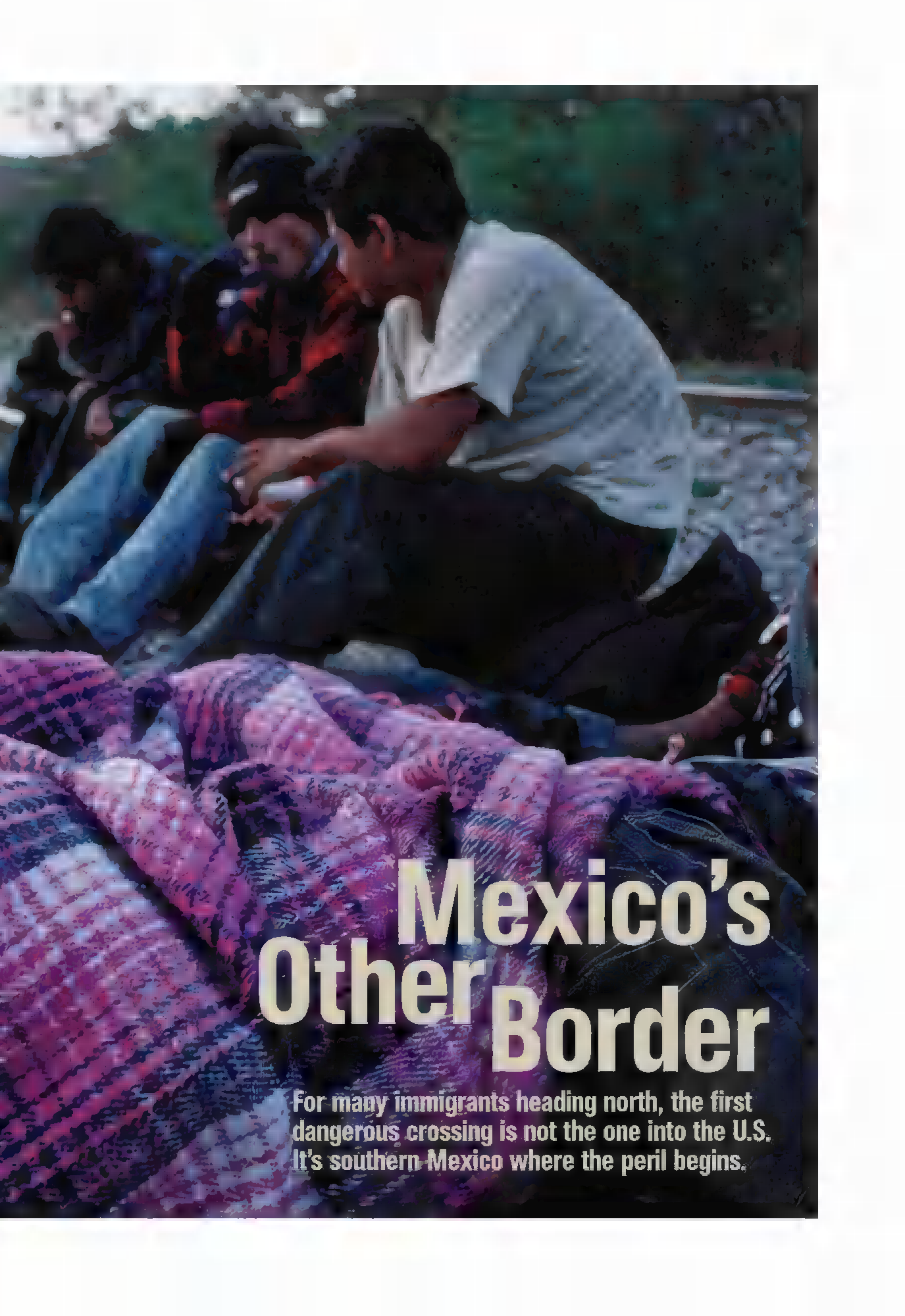
👉 **Race in Egypt** Learn what scientists have discovered about skin color and race among the ancient Egyptians at ngm.com.

Did the powerful Queen Tiye, King Tut's grandmother, have Nubian ancestry? This bust, made of wood that has darkened with age, has inspired claims that she did.





With steel for a pillow, Guatemalans near Arriaga, Mexico, an eight-day walk from the frontier, wait at the end of a freight line to catch a ride on a train. Perhaps a third of the migrants will eventually reach the United States.



Mexico's Other Border

For many immigrants heading north, the first dangerous crossing is not the one into the U.S. It's southern Mexico where the peril begins.





Goods and people cross the border illegally, in both directions. Hoisting cans of cheap Mexican gas to Guatemala, these porters skirt the official crossing—and an export ban. The price difference earns them six dollars a trip.



By Cynthia Gorney

NATIONAL GEOGRAPHIC CONTRIBUTING WRITER

Photographs by Alex Webb

Jessenia and Armando López crossed the Suchiate River from Guatemala into Mexico on a hired raft of wood planks lashed to giant inner tubes.

The raftsmen pegged them immediately as undocumented migrants and charged them ten times the usual fare, even though Jessenia thought she had disguised herself as a local lady by wearing platform shoes and carrying all her belongings in a homemaker's plastic shopping bag. She had managed to bathe and wash her clothes daily since they had left Nicaragua—in Mexico, Jessenia reminded her husband, thieves and officials identify migrants not only by their packs and caps and dirty walking sneakers, but also by the smell of their bodies on crowded buses. She put on makeup and perfume every morning, and dangling earrings. These were the rituals that gave her momentum, a certain degree of calm: launder, improve appearance, pray.

When they reached the Mexican side of the river, Armando unloaded the used mountain bicycle they had bought in Guatemala, and they waited while a uniformed soldier on the riverbank rifled indifferently through Jessenia's bag, explaining that he was looking for weapons or drugs. Then the soldier assessed them a ten-dollar bribe, and the Lópezes got on the bicycle and began to ride north.

Every year, hundreds of thousands of Central Americans cross illegally into Mexico—400,235, to cite one oddly precise estimate from the Mexican National Institute of Migration—along the country's southern border, which angles over 750 miles of river and volcanic slope and jungle at the top of Central America. Nobody knows exactly how many of those migrants are headed to the United States, but most put that figure at 150,000 or more a year, and the pace of illegal migration north has picked up dramatically over the past decade, propelled in part by the lingering aftermath of the 1970s and '80s civil wars in Guatemala, El Salvador, and



Porous Border

A narrow land bridge linking the impoverished south with the wealthy north, southern Mexico funnels migrants from Central America and beyond. Two main routes bypass the border's rugged terrain and lead to trains heading toward the U.S.

Nicaragua. In depictions of this modern Latin American migration into the United States, the image of a great wave is often invoked, and Mexico's southern border today feels like the place in distant water where the wave first rises and swells and gathers uncontrollable propulsive force.

Before the Lópezes left Managua, they had heard the counsel repeated now in certain poor neighborhoods of Central America: If you are leaving for El Norte, find Padre Flor Maria Rigoni in the city of Tapachula, 20 miles north of the border, because the first dangerous crossing you will make is not the one that takes you into the United States. It is at the southern Mexican border where the perils begin—the thugs, the drug runners, the extortionists in official uniforms, the

police and migration agents who pack undocumented migrants into detention facilities before forcing them onto buses to be deported. The Tapachula migration station was recently rebuilt, to hold 960 migrants and process them more quickly; the southward-bound buses roll out every morning before dawn.

The Lópezes rode for hours in the 90-degree heat, Jessenia standing on blocks attached to both sides of the bicycle's rear wheel. She carried her shopping bag in the crook of her arm and kept her hands on Armando's shoulders as he pedaled, avoiding migration checkpoints by veering at intervals off the pavement and onto dirt paths. They had remarkably good luck. No one assaulted them with machetes or rifles or handmade pistols fashioned from PVC pipes stuffed with gunpowder; no one beat Armando and dragged Jessenia into the weeds; no one forced them to undress so that their body cavities and secret sewn-in clothing pockets could be examined for

Cynthia Gorney, a former Washington Post South America bureau chief, is a professor at U.C. Berkeley's Graduate School of Journalism. Alex Webb has photographed extensively in Latin America. His last National Geographic feature was on the Amazon.

hidden money. No passing taxi driver decided to collect a payoff that day by alerting muggers or immigration officials that a vulnerable-looking couple was approaching on the road.

Toward the end of the afternoon Armando pedaled into the outskirts of Tapachula, rounded a curving downhill past an untended field of banana trees, and came to a stop at the wide red doors of the Casa del Migrante, where Padre Rigoni took them in.

FLOR MARIA RIGONI is a wiry 64-year-old Italian priest who speaks six languages, has a cascading gray beard, uses a thin mattress on the floor for a bed, and wears a wooden cross jammed like a holstered weapon into the belt of his cotton vestments. His Casa del Migrante is a nerve center, an improvised message and transit depot, and an international sanctuary. He first arrived in Mexico more than 20 years ago, dispatched from his previous posting among Italian migrants in Germany.

"Migration, for me, is where we really encounter the God of the Bible—the God of Abraham, of Exodus, of the great journey," he told me one day, in his Italian-accented Spanish, as we sat on worn couches in an open-air alcove where he receives migrants seeking advice or a blessing. At the entrance to the Casa's dining hall is a bronze statue of John Baptist Scalabrini, the 19th-century Italian bishop who founded the order to which Rigoni belongs. The pastoral mission of the Scalabrinians is the care of migrants; the missionaries run centers in 24 countries, including four in Mexico and one just across the Suchiate River in Tecún Umán, on the Guatemalan side of the raft crossing. Three of the Mexican Casas del Migrante—in Tijuana, Ciudad Juárez, and Tapachula—were built up by Rigoni.

One evening, three dozen migrants sat on the sidewalk just outside the entrance to the Casa, too hot to go inside. A rooster crowed, and the migrants talked in low voices and smoked cigarettes, which a vendor across the street was selling for 15 cents apiece. Several huddled around

a pay phone, peering by flashlight at pieces of paper with area codes indicating Houston and Atlanta and Pittsburgh and Chicago.

There was a 19-year-old Honduran who wrote poems every night about leaving his beloved behind in order to cross the border into America; he was on his way, he had decided, to Los Angeles. There was a Nicaraguan construction worker on his way back to Santa Cruz, California, where he had lived for six years, until American immigration officials threw him out. There was a Guatemalan woman on her way to a sister in North Carolina; a Salvadoran couple, passing their swaddled baby back and forth in the darkness, on their way to cousins in Maryland they'd never met; and a 15-year-old Salvadoran boy who turned to me suddenly, after learning I was American, and asked, "You have streets there with three lanes on each side, right?" He nodded when I confirmed this was so and said he intended to fall in love in the United States.

On a map on the Casa's entrance wall, someone had attached a note containing distances, in kilometers. Tapachula to New York: 4,375. To Houston: 2,930. To Chicago: 3,678. Above the map was a warning poster about the hazards of the Texas and Arizona crossings—don't risk it, the desert temperatures can be fatal. I had seen no one so much as glance at the poster.

"Where are we going? We don't know," said Fernando Somosa, a lanky Nicaraguan boy with an enormous smile, punching the arm of his friend José Ramos, who had left their village with him four days earlier. "We're just going where the dollars are." Somosa was wearing a shirt he had bought secondhand in a market near his home; it had permanent-marker writing on it, in a loopy scrawl: "To Alyssa—Ur Super Cool! Meghan."

Jessenia López sat with her back against a boulder, her hair still damp from the shower. "Miami," she said, when I asked where she and Armando, a car mechanic and handyman, hoped to find work. "We have a friend there. We're carrying her phone number. But we haven't been able to reach her. We don't know what to do." She is 33 and Armando 29; they



Guatemalan border towns such as El Carmen are booming as they cater to the growing stream of migrants—offering meals, Mexican currency, cut-rate hotels, and three-wheeled-taxi rides to the frontier.



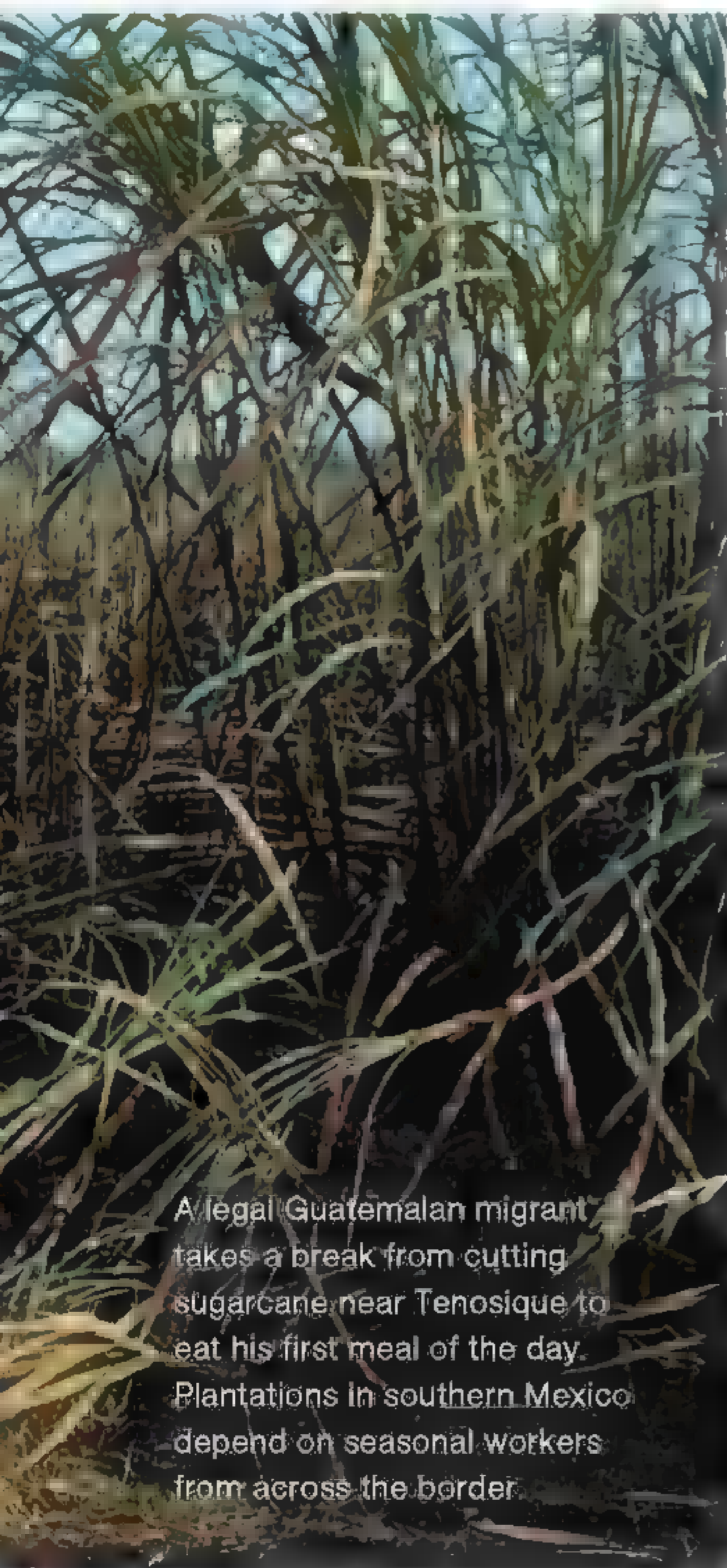
When Jessenia told me her baby was two years old, she began to cry, but she pressed her hand against her face and stopped: “It’s just need that makes you do certain things.”



had left their three children—two teenagers and a baby—with her family in Managua. When Jessenia told me her baby was two years old, she began to cry, but she pressed her hand against her face and stopped. “I never in my life thought I was going to do this. It’s just need that makes you do certain things.”

The wire gate beside the Casa swung open in the shadows, and from the building next door,

where he lives, Padre Rigoni came out and looked at the migrants on the sidewalk. “Well, *muchachos*,” he said. He had taken off his vestments and was barefoot, in a dark T-shirt and rolled-up dungarees. He sat under a broad-leaved tree, near the boulder where Jessenia López was resting her head against Armando’s chest, and for a while Rigoni and the migrants talked about violence in Guatemala and



A legal Guatemalan migrant takes a break from cutting sugarcane near Tenosique to eat his first meal of the day. Plantations in southern Mexico depend on seasonal workers from across the border.

kidnappings in Nicaragua and other grim accounts they were hearing from the road.

“I remember the first Nicaraguan migrant I ever met, 20 years ago,” Rigoni said. “He was 17. This was in Tijuana. He’d found some work there, but he’d keep looking in the direction where the border was, until one day he decided to go across. I got a letter from him, from San Diego. ‘Here I am, Padre. But I live like an

armadillo. Every time I go outside, I feel as though I have to hide. I can’t do this. I’m going back.’”

The migrants were silent. Rigoni sighed and stood up to go inside. He also had letters from migrants who told him they thanked God every day for having guided them to the United States; why the armadillo story had come to mind just then he would not later be able to say, except that he had learned over time that his pastoral role was not to urge migrants onward or back, but rather to give them shelter and blessing and a safe place to consider the enormous implications of what they had decided to do. “*Muchachos*,” he said, “*mantengan sus corazones...*” He hesitated, gazing at them, one hand on the gate. “*Sanos*,” he said finally. “Guard your hearts, children. Keep them... healthy.”

MEXICO’S SOUTHERN BORDER bends east and northeast, from the Pacific at one end to the Caribbean at the other, much of it tracing the bottom of the big Mexican state of Chiapas. The city of Tapachula remains one of the principal gateways for Central American migrants; for many years this city was the southern terminus of the freight train that rumbles north toward the U.S. border, with migrants clinging to the roofs and sides. They call the train *la bestia*, the beast, and it is the subject of grim warnings about the importance of staying awake on the roofs of the rolling cars, lest one lose one’s grip and fall to dismemberment or death. There is a celebrated recuperation facility in Tapachula, run on donations, that takes in migrant amputees who have fallen from the freight trains and lost arms or legs beneath the metal wheels.

Tapachula is a city of 270,000 whose commercial streets and big central plaza crowd late into the night with taxis, motorcycles, delivery trucks, *colectivo* jitneys, businessmen on cell phones, teenage girls in tight blue jeans, Maya women in woven skirts, boys selling DVDs, children selling candy, and women slicing chili-powder-sprinkled mango and papaya into small plastic bags. Immigrants helped build the city’s economy—coffee merchant and hotelier Tomás

When Mexicans talk about undocumented migrants in their midst, they sound like Americans: resentful, sympathetic, patronizing, perplexed.

Edelmann Blass inherited his German great-grandfather's plantation north of town; orthopedist José Mak Chong is a second-generation Chinese Mexican—and when they talk now about undocumented migrants in their midst, they sound like Americans: resentful, sympathetic, patronizing, perplexed. A Mexican shop owner in Tapachula described the trouble with the Central Americans in town: The Guatemalans are too servile, he said, the Hondurans too gang-inclined, the Salvadorans too hotheaded. And all of them—simply because they're isolated, vulnerable, and likely to be carrying money—attract assailants whose toxic presence alarms everybody in town. “I suppose I'd hire a Guatemalan over a Honduran, and a Honduran over a Salvadoran,” the shop owner said. “These people aren't interested in staying in Mexico anyway. Those dollars are pulling them north.”

In Chiapas, where coffee, banana, and mango harvests have depended for decades on Guatemalan agricultural workers, employers underpay undocumented workers or refuse to pay them at all, counting on them to fear repatriation too much to complain. Gang members as well as freelance toughs lurk along the riverbanks and footpaths, alert to the backpack-carrying travelers who may have money secreted away. Although certain villages along the freight train routes are known for locals who hand free food up to the migrants hanging off the railroad cars, the locals at other stops jump onto the cars to beat and rob migrants, sometimes with police watching or joining in.

The word “porous” is *poroso* in Spanish, and you hear it from both Mexicans and Americans who study Mexico's southern border and its increasingly complicated relationship to the United States. The U.S. wants the border made less porous even as American employers keep demanding cheap labor and American drug users keep demanding smuggled cocaine. The drug routes and the migrant routes overlap only occasionally; organized drug smugglers prefer sea or air for most major cross-border

transport. But the simplicity with which people and goods pass illegally across this border is obvious to anyone who spends time here.

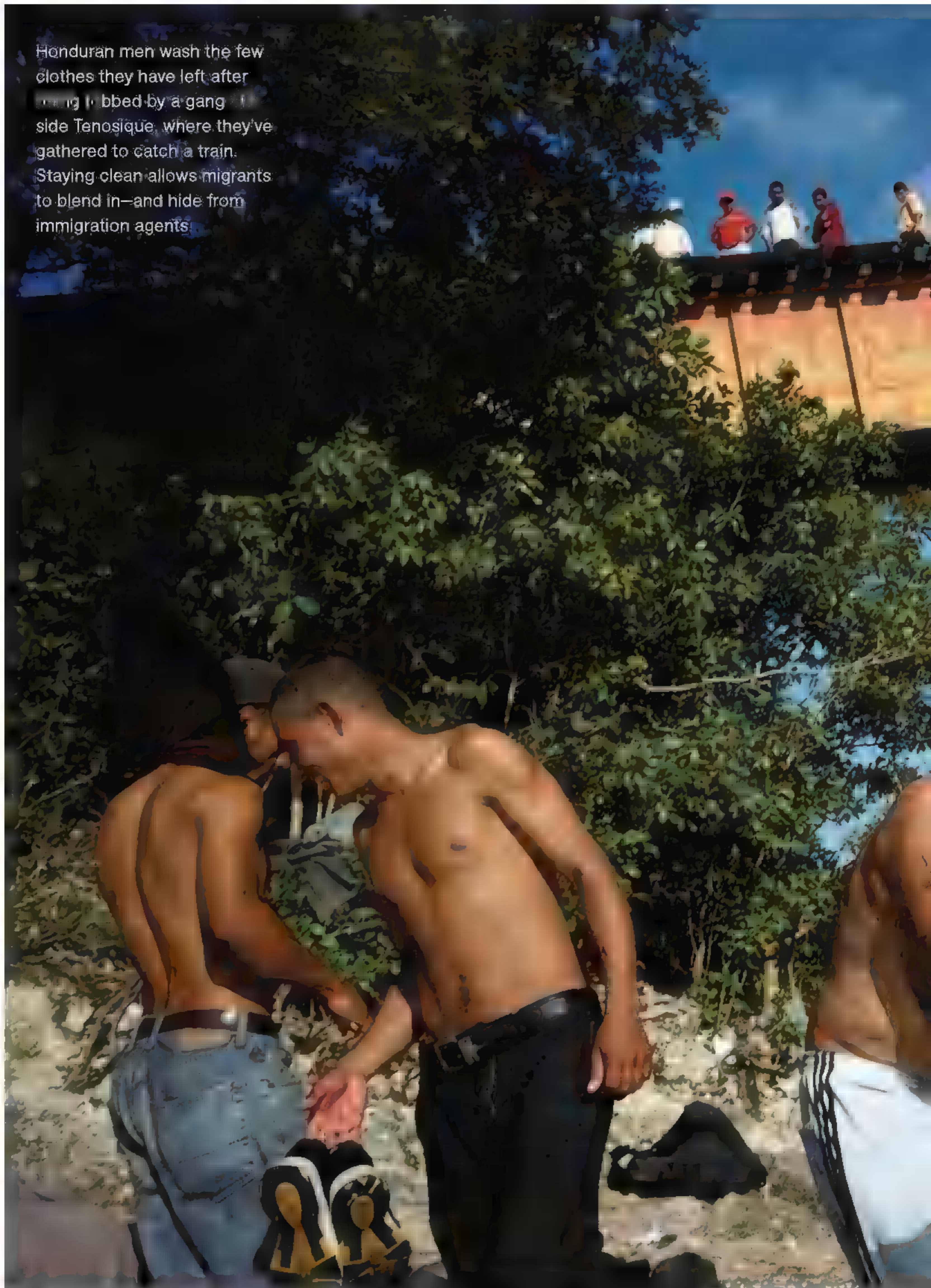
It is possible to cross from Guatemala to Mexico by wading a river alongside day laborers on horseback and families washing laundry; or by strolling through a wide-open gate on a dirt road, while nearby Mexican customs agents ignore you; or by paying rafters the equivalent of a dollar to punt you across the Suchiate River. Around the uniformed Mexican soldier at the riverbank, improvised commerce bustles and hums: Brightly painted tricycle rickshaws carrying passengers and their parcels; taco vendors flipping hot tortillas on propane-powered grills; boxes of tequila and black beans and Crema Dental Colgate Triple Acción being tricycled to the raft landing and stacked 20 high for the cross-river float to the Guatemalan side, where they will be resold without the encumbrances of government paperwork.

“Look, this is a business,” said Rafael Fernández de Castro, a Mexico City international relations professor. He meant not only the daily business along the riverbank, but also the broader “business arrangement” created by the desperation of the Latin American poor and the fierce economic pull from the north. American dollars that working migrants send south to their families now help prop up banks, money transfer companies, and entire national economies; in Honduras in 2006, remittances sent home from the United States accounted for a fifth of the nation's gross national income. The human smugglers called coyotes, their work a crime under Mexican law, charge \$5,000 to \$7,000 a head to bring Central Americans across the southern Mexican border, up the length of Mexico, and then into the United States; they distribute payoffs along the way. More sophisticated international operations charge several times that amount to smuggle migrants who have reached Central America by sea or by air: Chinese, Africans, South Asians. Central America's geography, a narrow isthmus flanked by water, turns it into a funnel for immigrants



Riding "the beast," exhausted men cling to tanker cars during a jerky, seven-hour trip to Palenque. If they fall asleep, they can tumble off.

Honduran men wash the few clothes they have left after being robbed by a gang on the side of Tenosique, where they've gathered to catch a train. Staying clean allows migrants to blend in—and hide from immigration agents.





from South America and all over the world.

"There is no solution to this," a former Chiapas state official said wearily, after ticking off a list of southern border upgrade programs that have fizzled into ineffectiveness over the past decade. "You can put all the control measures down there that you want, but it's not going to be fixed. The solution is to eliminate poverty."

A LONGTIME VOLUNTEER at the Casa del Migrante in Tapachula told me that some people call Padre Rigoni "El Caterpillar." I imagined migrants inching their way to new locations, morphing into butterflies, taking wing. But the Spanish word for caterpillar is *oruga*, so I asked why the nickname was in English.

She burst out laughing. "Not that kind," she said. "The Caterpillar. The earthmover truck that goes around opening roads by force."

Rigoni preaches barefoot, in the thatched-roofed outdoor chapel in the Casa's garden, and when he is absorbed in the Mass he bounces on the balls of his feet, his palms upturned, his face suffused with emotion. I have heard congregants warn him, during the lighting of candles for the service, not to set fire to his beard. The Mexican government gave him a national human rights award in 2006; he flew to Mexico City to collect it, dressed as usual in his white vestments and sandals, and he was congratulated and fussed over. Then he came home and went back to making trouble, publicly denouncing the mistreatment of migrants. He believes that the desperation of the poor is scattering death along the length and breadth of the Mexican migration routes. "There are crosses here without names," Rigoni told me. "There are cemeteries here without crosses. Some of the people in the Casa say to me: 'For us, all of Mexico has turned into a cemetery without crosses.'"

How would Rigoni respond to American charges that the Central Americans he helps are intent on breaking immigration laws and taking what should be legal American residents' jobs?

Rigoni smiled. "First of all, I would say that your premise is mistaken. There are enough

jobs. Nobody leaves home in search of unemployment. Nobody uproots completely unless they have the most profound motives. These migrants are the very hardest workers, the people most willing to push for their futures."

He nodded in the direction of the Scalabrini sculpture. "I look to our founder to answer this question. We believe in the right to migrate, but we do not believe in the right to force people into migration. Mexico, Honduras, El Salvador, Nicaragua, Guatemala—they share the responsibility for what is happening. I've been in these countries. I have seen clearly the division between levels of society."

Most migrants are limited to a three-day stay at the Casa. After that—once they have slept between clean sheets for a couple of nights, eaten a few hot meals of meat stew and black beans and tortillas—they begin the next leg north. Until two years ago that meant finding the rail yard in Tapachula and hiding from police while waiting to climb onto a departing freight train. But in late 2005, Hurricane Stan destroyed the tracks leading to Tapachula, forcing the migrants to travel by road to the makeshift new freight train terminus in the town of Arriaga, 150 miles north. So migrants pool money for taxis, or they walk, or they take buses and hope no one will board asking for papers.

Word has spread in Central America that migrants traveling through Tapachula are at high risk of being picked up by migration agents. For this reason a second border-crossing region began flourishing in eastern Chiapas and the neighboring state of Tabasco, which also abuts Guatemala: Fewer Mexican migration agents work there, but many more assailants lurk on the footpaths.

The grim calculus of risk—greater likelihood of deportation around Tapachula, greater likelihood of assault in eastern Chiapas and Tabasco—had been carefully considered by every migrant I met. In Tabasco whole swaths of arid countryside had been ceded to assailants after dark; even police did not go near them at night. On one bleak stretch, officials found a tree

José Mauricio left El Salvador with the dream of a better life—only to lose a leg to the train. Now he makes bracelets that sell for 90 cents apiece in Tapachula, while waiting for an artificial limb.



decorated with women's undergarments: trophies, each from a different rape.

When I asked Rigoni whether he intended to open a Casa del Migrante in Tabasco, he shook his head. "We don't have the personnel," he said. "I can counsel them, offer assistance. Someone has to help stop the exploitation and violence." He smiled, just slightly, and switched to English. "But the Caterpillar needs a tune-up," he said.

THE MORNING I ARRIVED in Arriaga, a dry, hot wind was wrapping plastic garbage bags against barbed-wire fencing at the edge of town. The main street was four blocks long and ran straight across the railroad tracks, which appeared deserted; a half mile or so down the length of track, two railcars sat motionless amid the high weeds.

Then Francisco Aceves put a whistle between his lips. Aceves is an engineer who runs the southern Chiapas branch of the federal migrant protection agency called Grupo Beta. The U.S. has no equivalent to the Grupo Beta agents, who are explicitly directed not to check for documentation nor to turn people over to federal or migration police. "*Grupo Beta! Agua!*" Aceves shouted, blowing his whistle. There was movement in the weeds. A young man with a bandanna around his forehead stepped out, straightening his back as he emerged. Another came out behind him, and then another, and a woman, and six more men, the weeds parting

and people climbing out and seeing Aceves and his bright orange Beta shirt and breaking into a trot as they approached. Soon nearly a hundred people had surrounded the truck. "Make a line!" Aceves cried. "Here's water for you! Who wants a can of tuna? Anybody have a headache?"

I saw faces I recognized from the Casa del Migrante: Fernando Somosa and José Ramos, the young Nicaraguan men who had announced they were going wherever the dollars are. Somosa, the lanky one with the big smile, was still wearing the shirt with the loopy handwriting on it. Jessenia and Armando López, they said, were still back at the Casa. Jessenia was trying to overcome her fear of the train.

Aceves handed out booklets instructing migrants that even if they have no documentation, no one is supposed to rob or abuse them. He held one of the booklets up and cleared his throat. "Remember the worst is still ahead of you. In some parts of where you're going, the days can go above 50 degrees"—Celsius, he meant, or 120 degrees Fahrenheit. "There are thieves on these roads, and rapes happen not just to women. Don't get on trains while they're moving. It's better to wait for the next train than to lose a leg."

It was the third perils-of-the-journey lecture that Somosa and Ramos had heard in a week, and they both walked away, lit cigarettes, and squatted on the track beside a half dozen men who had been waiting two days for the train. No schedule is posted for the freights; locomotives

arrive every few days, gather train cars, and roll out without advance notice, sometimes in the middle of the night. Somosa and Ramos had lain all night on the ground, curled up against the wall of a house near the tracks.

I asked how they would respond if they got to the U.S., somehow eluding all the newly stepped-up illegal immigration enforcement, and then Americans said to them: Boys, I'm sorry you came all this way, but without papers there isn't any work for you here.

Somosa shrugged. Ramos said, "I'll keep looking. I'll find my own work."

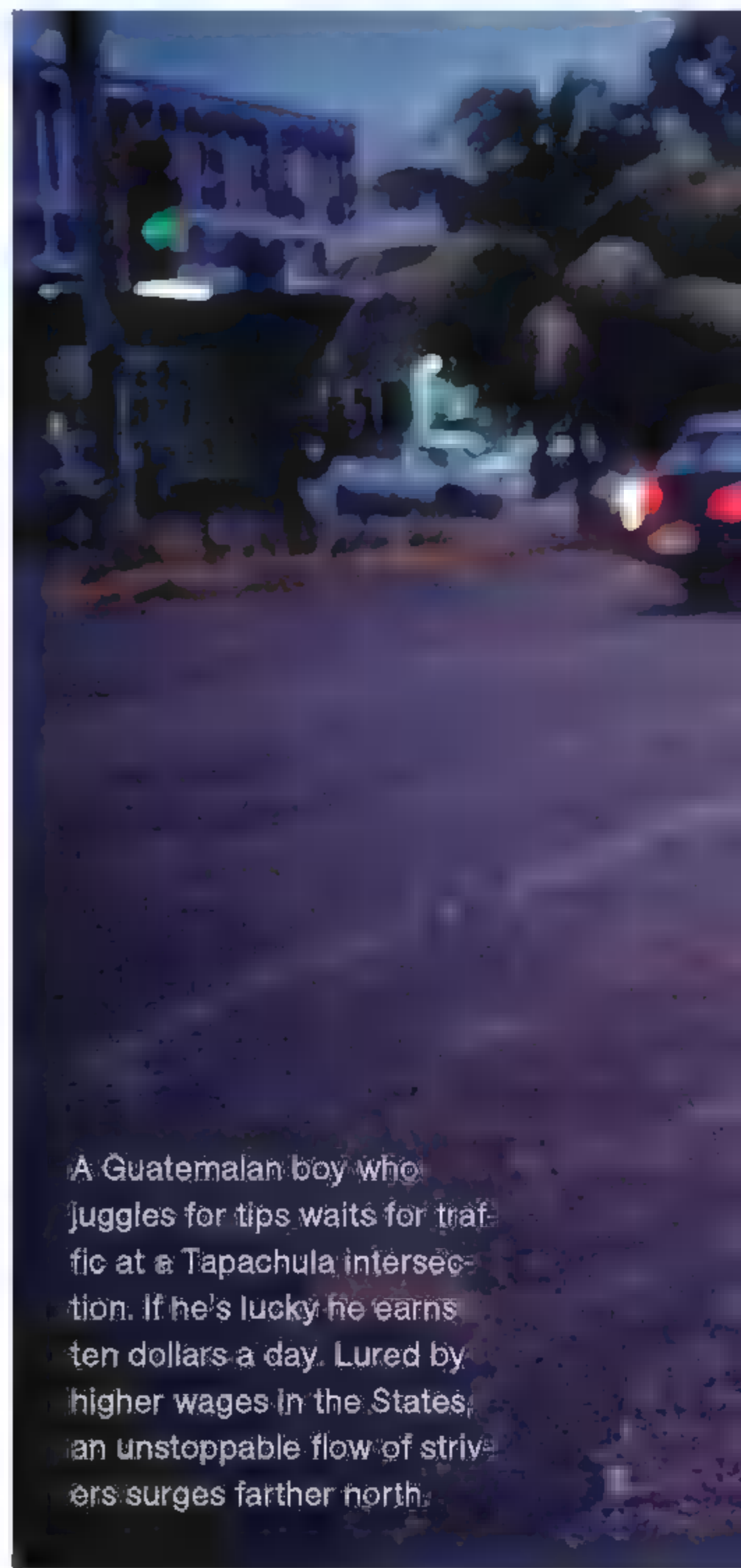
"You didn't answer her question," said a 56-year-old man who overheard our conversation. He was on his way back to Houston, he said, where he'd been living before being called home to Honduras when his mother died. "You have to be able to answer this question," the man said. "The answer is this: 'You Americans have plenty of work. You're not going to do the cleaning. You're not going to take out the garbage. That is for the Latino, or the black person.'"

The Honduran man leaned in, his voice urgent. "Look," he said, "they're going to offer you seven dollars an hour. That seems like a lot of money. But do you know what rent costs? You're going to want a girlfriend. You're going to want to visit the cantina. 'Hey, give me a Bud Light!' How are you going to eat?"

A look of uncertainty flickered across Somosa's face. In Nicaragua he had a single mother and seven siblings, not including the one who had died of alcoholism after leaving to find work in Costa Rica. He was 21 years old. "If a door is closed on me, I'll open another one," he said, and he radiated the big smile. "I have to go live in the land of marvels."

Ramos got up impatiently and stretched his legs. "The land of illusions," he said. "They receive you, and they reject you." In Spanish, in his soft voice, it sounded like a line of poetry: "*El país de las ilusiones: Te reciben, y te rechazan.*"

By midnight there was still no sign of a train. At a hotel nearby, the desk clerk said he would hear the engine when it came. He said everyone



A Guatemalan boy who juggles for tips waits for traffic at a Tapachula intersection. If he's lucky he earns ten dollars a day. Lured by higher wages in the States, an unstoppable flow of strivers surges farther north.

in town would hear it, that the metallic crashing of the freight trains was the loudest noise in Arriaga. He promised to ring my room when it began. But that night the warm wind came up hard, rattling the window glass, and the desk clerk never called, and when I went out at dawn, the two railcars that had been standing on the tracks were gone. The gusts picked up empty Doritos bags and plastic cola bottles and skittered

“You Americans have plenty of work. You’re not going to do the cleaning. You’re not going to take out the garbage. That is for the Latino.” —A 56-YEAR-OLD HONDURAN MIGRANT



them across the dirt. Burlap sacks still flattened the weed patches where the migrants had slept. I tried to imagine the scramble onto the freight cars in the moonlight: The only handholds are high metal pipes, and the edges of the massive metal wheels look as sharp as ax blades.

I wondered whether the two Nicaraguan friends were seated side by side atop one of the boxcars as their train rocked along, holding the

roof rails tightly; or whether they had chosen to stand, the way I had seen some of the southern border migrants ride the northbound train: feet apart, shoulders back, balancing like surfers with their arms in the air. □

✦ **The Pull North** Photographer Alex Webb talks about his images of migrants crossing Mexico’s southern border at ngm.com.



LORD OF THE FOREST

**CAN THE ENDANGERED PHILIPPINE EAGLE SURVIVE
IN THE SHRINKING FORESTS OF ITS ISLAND HOME?**

Avian king of the rain forest canopy, the Philippine eagle is defenseless against logging and land clearing. But there is hope: Birds such as this one, raised in captivity on the island of Mindanao, may one day be released into restored habitat.



PHOTOGRAPHS BY KLAUS NIGGE

If the irrevocable transition of one species from rarity to extinction causes a rent in the fabric of our planet, exactly how big a hole would be left by the loss of the Philippine eagle?

No disrespect is meant to the basking malachite damselfly or the fine-lined pocketbook mussel, because all creatures—and plants too—help turn the infinitely complex cogs of the biosphere. But the loss of this glorious bird would steal some of the world's wonder. It glides through its sole habitat, the rain forests of the Philippines, powerful wings spread to seven feet, navigating the tangled canopy with unexpected precision. It is possible that no one has ever described this rare raptor, one of the world's largest, without using the word "magnificent." If there are those who did, then heaven heal their souls.

In the kind of irony all too familiar to conservationists, however, the very evolutionary adaptations that made it magnificent have also made it one of the planet's most endangered birds of prey. There is no competition for prey from tigers, leopards, bears, or wolves in the Philippine archipelago, the eagle's only home, so it became, by default, the king of the rain forest. Expanding into an empty ecological niche, it grew to a length of three feet and a weight of up to 14 pounds. A nesting pair requires 25 to 50 square miles of forest to find enough prey—mammals such as flying lemurs and monkeys; snakes; and other birds—to feed themselves and the single young they produce every other year.

"The birds had the islands all to themselves, and they grew big," says Filipino biologist Hector Miranda, who has studied the eagles extensively. "But it was a trade-off, because the

Klaus Nigge lives in Germany. This is his third story for National Geographic. Mel White, who lives in Arkansas, has been hooked on birds since childhood.

forest that created them is almost gone. And when the forest disappears—well, they're at an evolutionary dead end."

Indeed, with deforestation rates in the Philippines among the highest in the world (more than 90 percent of primary forest may have been lost to logging and development), the eagle has been reduced to a population estimated at several hundred breeding pairs.

Awareness about conservation issues, however, is rising in the Philippines. A series of devastating floods and mud slides in the past decade





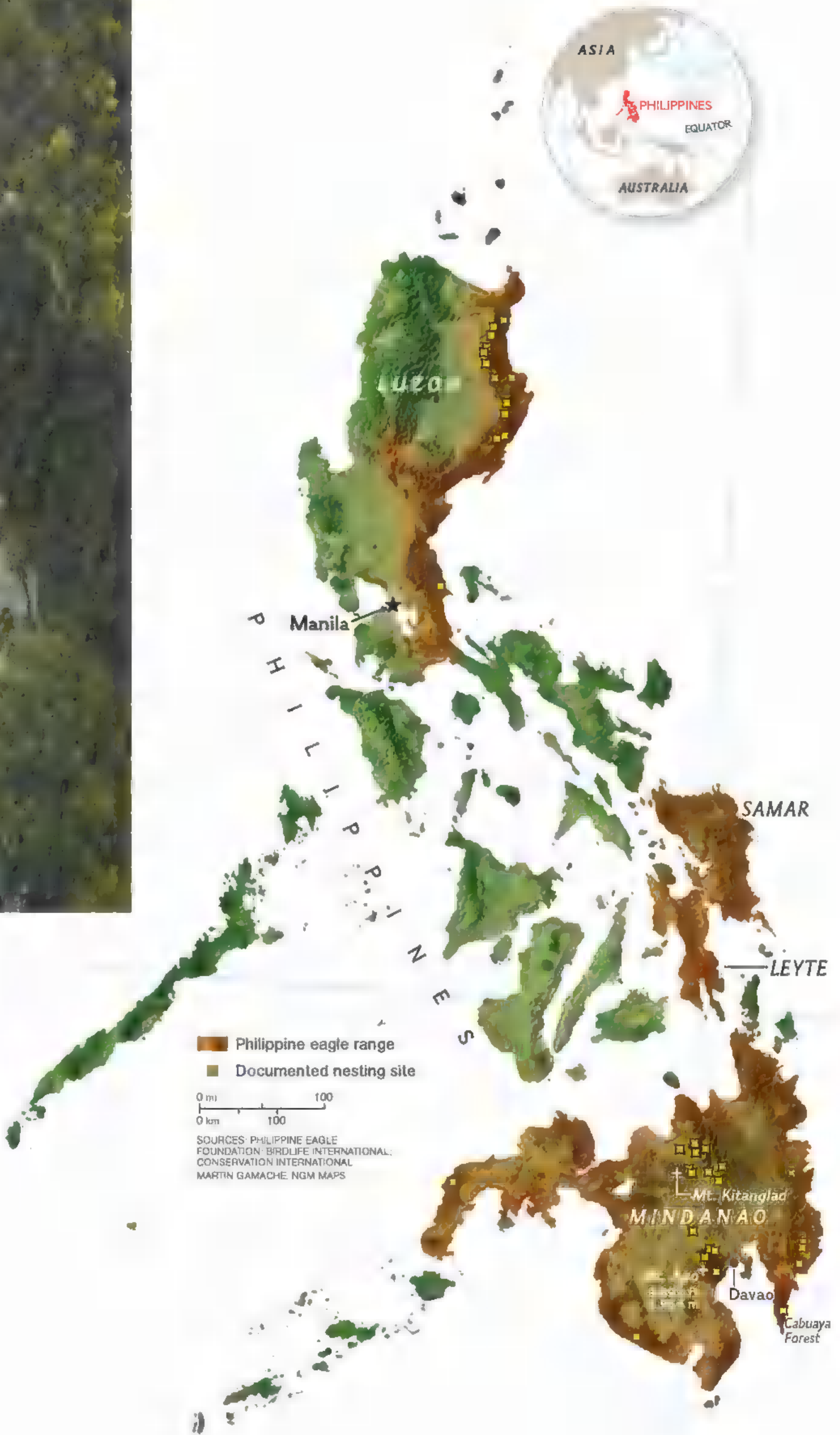
TOP PREDATOR Evolving without competition from big cats and other large predators, the eagles became the dominant hunters in Philippine forests. Their size—each may grow to 14 pounds—means they need ■ vast home range of tropical forest to find enough food.

has convinced Filipinos that the loss of forest affects not just wildlife but people too. In recent years new protected land areas have been established in the Philippines; one, the 17,300-acre Cabuaya Forest, specifically protects the eagle. And in an effort to prevent the eagle population from dwindling further, the Philippine Eagle Foundation on Mindanao island is working to educate Filipinos about the bird, which was declared a national emblem in 1995. At least some of those who once would have shot an eagle for food or sport now let it soar unmolested.

Meanwhile, visitors to the foundation's education center can see more than a dozen eagles, some of which were rescued after they were trapped or shot. Twenty-one birds have been raised as part of a breeding program that aims someday to release birds back into restored habitat on the Philippine Islands. Will the efforts be enough? Perhaps. The first surviving chick in that program just celebrated his 16th birthday. When he was born he was given the name Pag-asa, the Tagalog word for hope. —*Mel White*



HIGH—BUT NOT ALWAYS DRY Breeding pairs favor tall trees with open crowns. Nests, such as this one on Mindanao, are built at heights ranging from 80 to 160 feet and often used for consecutive nestings. Each pair needs 25 to 50 square miles to successfully raise a single chick, making the species highly vulnerable to the rampant deforestation of recent decades. The eagle is known to exist only on four islands, with the largest number observed on Mindanao. This young eagle, about five months old, took its first flight three days after the photograph was taken.







TWO WAYS TO RAISE AN EAGLET A 15-week-old eaglet exercises its wings in preparation for a first flight—but hardly a departure. Young birds may remain near their parents, and at least partly in their care, for nearly a year and a half. At first both adults provide for the young; the mother (upper left) feeds a chick on Mount Kitanglad in Mindanao. Long known as the monkey-eating eagle, the species was renamed Philippine eagle in 1978 in part to promote national pride. Besides monkeys, eagles eat palm civets, flying squirrels, fruit bats, birds, and snakes. Workers in the captive-breeding program at the Philippine Eagle Foundation near Davao, Mindanao, serve a similar diet to chicks; keepers cover their hands with eagle-head puppets to prevent the chicks from imprinting on humans (lower left). After years of failure, 21 eaglets have been hatched in the program, and conservationists are experimenting with ways to release captive-bred birds into restored forest.

👉 **In Praise of Magnificence** See more Klaus Nigge photos of the bird with the “special face,” and find out how to help the endangered species at ngm.com.





PRECARIOUS PERCH On alert, an eagle raises its crest—a display seen in both sexes. This female inhabits a protected park on Mount Apo in Mindanao. Conservation efforts could slow deforestation and assure the Philippine eagle ■ secure home. □



drying of the west

The American West was won by water management. What happens when there's no water left to manage?



In drought-parched
Los Padres National
Forest in southern
California, a heli-
tanker douses a hot
spot in the huge
Zaca fire that erupted
in July 2007, scorch-
ing 240,000 acres.
Years of sparse rain
primed the region
for the second
largest fire in
California history.





Well water allows
the lush greens and fair
ways of the Arroyo Val-
ley Golf Club to flourish
in the Mojave Desert—a
barren dry place where
desert plants normally
survive. Though wells
have been proposed
for courses in nearby
southern Nevada still
use 3 percent of the
region's water.



Lake Powell's "bathtub ring"—a residue from water immersion—records how far the water level has fallen in the giant reservoir. Inflow from the Colorado River has been below average every year but one since 1999, when Powell was last full. It's now below 50 percent capacity and dropping.



By Robert Kunzig

Photographs by Vincent Laforet

When provided with continuous nourishment, trees, like people, grow complacent.

Tree-ring scientists use the word to describe trees like those on the floor of the Colorado River Valley, whose roots tap into thick reservoirs of moist soil. Complacent trees aren't much use for learning about climate history, because they pack on wide new rings of wood even in dry years. To find trees that feel the same climatic pulses as the river, trees whose rings widen and narrow from year to year with the river itself, scientists have to climb up the steep, rocky slopes above the valley and look for gnarled, ugly trees, the kind that loggers ignore. For some reason such "sensitive" trees seem to live longer than the complacent ones. "Maybe you can get too much of a good thing," says Dave Meko.

Meko, a scientist at the Laboratory of Tree-Ring Research at the University of Arizona, has been studying the climate history of the western United States for decades. Tree-ring fieldwork is hardly expensive—you need a device called an increment borer to drill into the trees, you need plastic straws (available in a pinch from McDonald's) to store the pencil-thin cores you've extracted from bark to pith, and you need gas, food, and lodging. But during the relatively wet 1980s and early '90s, Meko found it difficult to raise even the modest funds needed for his work. "You don't generate interest to study drought unless you're in a drought," he says. "You really need a catastrophe to get people's attention," adds colleague Connie Woodhouse.

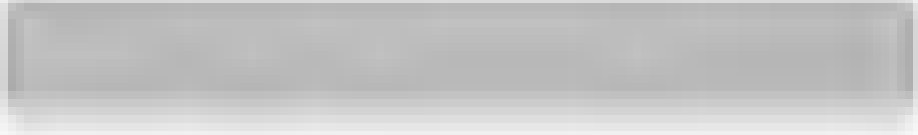
Then, in 2002, the third dry year in a row and the driest on record in many parts of the Southwest, the flow in the Colorado fell to a quarter of its long-term average. That got people's attention.

The Colorado supplies 30 million people in seven states and Mexico with water. Denver, Las Vegas, Phoenix, Tucson, Los Angeles, and San Diego all depend on it, and starting this year so will Albuquerque. It irrigates four million acres of farmland, much of which would otherwise be desert, but which now produces billions of

dollars' worth of crops. Gauges first installed in the 19th century provide a measure of the flow of the river in acre-feet, one acre-foot being a foot of water spread over an acre, or about 326,000 gallons. Today the operation of the pharaonic infrastructure that taps the Colorado—the dams and reservoirs and pipelines and aqueducts—is based entirely on data from those gauges. In 2002 water managers all along the river began to wonder whether that century of data gave them a full appreciation of the river's eccentricities. With the lawns dying in Denver, a water manager there asked Woodhouse: How often has it been this dry?

Over the next few years Woodhouse, Meko, and some colleagues hunted down and cored the oldest drought-sensitive trees they could find growing in the upper Colorado basin, both living and dead. Wood takes a long time to rot in a dry climate; in Harmon Canyon in eastern Utah, Meko found one Douglas fir log that had laid down its first ring as a sapling in 323 B.C. That was an extreme case, but the scientists still collected enough old wood to push their estimates of annual variations in the flow of the Colorado back deep into the Middle Ages. The results came out last spring. They showed that the Colorado has not always been as generous as it was throughout the 20th century.

The California Department of Water Resources, which had funded some of the research, published the results as an illustrated poster. Beneath a series of stock southwestern postcard shots, the spiky trace of tree-ring data oscillates nervously across the page, from A.D. 762 on the left to 2005 on the right. One photo shows the Hoover Dam, water gushing from its outlets. When the dam was being planned in the 1920s to deliver river water to the farms of the Imperial Valley and the nascent sprawl of Los Angeles, the West, according to the tree rings, was in one of the wettest quarter centuries of the past millennium. Another photo shows the booming skyline of San Diego, which doubled its population between 1970 and 2000—again, an exceptionally wet period along the



The wet 20th century, the wettest of the past millennium, the century when Americans built an incredible civilization in the desert, is over.

river. But toward the far left of the poster, there is a picture of Spruce Tree House, one of the spectacular cliff dwellings at Mesa Verde National Park in southwestern Colorado, a pueblo site abandoned by the Anasazi at the end of the 13th century. Underneath the photo, the graph reveals that the Anasazi disappeared in a time of exceptional drought and low flow in the river.

In fact, the tree rings testified that in the centuries before Europeans settled the Southwest, the Colorado basin repeatedly experienced droughts more severe and protracted than any since then. During one 13-year megadrought in the 12th century, the flow in the river averaged around 12 million acre-feet, 80 percent of the average flow during the 20th century and considerably less than is taken out of it for human use today. Such a flow today would mean serious shortages, and serious water wars. “The Colorado River at 12 million acre-feet would be real ugly,” says one water manager.

Unfortunately, global warming could make things even uglier. Last April, a month before Meko and Woodhouse published their latest results, a comprehensive study of climate models reported in *Science* predicted the Southwest’s gradual descent into persistent Dust Bowl conditions by mid-century. Researchers at the National Oceanic and Atmospheric Administration (NOAA), meanwhile, have used some of the same models to project Colorado streamflow. In their simulations, which have been confirmed by others, the river never emerges

from the current drought. Before mid-century, its flow falls to seven million acre-feet—around half the amount consumed today.

The wet 20th century, the wettest of the past millennium, the century when Americans built an incredible civilization in the desert, is over. Trees in the West are adjusting to the change, and not just in the width of their annual rings: In the recent drought they have been dying off and burning in wildfires at an unprecedented rate. For most people in the region, the news hasn’t quite sunk in. Between 2000 and 2006 the seven states of the Colorado basin added five million people, a 10 percent population increase. Subdivisions continue to sprout in the desert, farther and farther from the cities whose own water supply is uncertain. Water managers are facing up to hard times ahead. “I look at the turn of the century as the defining moment when the New West began,” says Pat Mulroy, head of the Southern Nevada Water Authority. “It’s like the impact of global warming fell on us overnight.”

In July 2007 a few dozen climate specialists gathered at Columbia University’s Lamont-Doherty Earth Observatory to discuss the past and future of the world’s drylands, especially the Southwest. Between sessions they took coffee and lunch outside, on a large sloping lawn above the Hudson River, which gathers as much water as the Colorado from a drainage area just over a twentieth the size. It was overcast and pleasantly cool for summer in New York. Phoenix was on its way to setting a record of 32 days in a single year with temperatures above 110 degrees. A scientist who had flown in from the West Coast reported that he had seen wildfires burning all over Nevada from his airplane window.

On the first morning, much of the talk was about medieval megadroughts. Scott Stine of California State University, East Bay, presented vivid evidence that they had extended beyond

Robert Kunzig’s book Fixing Climate, with Wallace Broecker, will be published in April. Vincent Laforet won a 2002 Pulitzer Prize for feature photography.



the Colorado River basin, well into California. Stine works in and around the Sierra Nevada, whose snows are the largest source of water for that heavily populated state. Some of the runoff drains into Mono Lake on the eastern flank of the Sierra. After Los Angeles began diverting the streams that feed Mono Lake in the 1940s, the lake's water level dropped 45 vertical feet.

In the late 1970s, tramping across the newly exposed shorelines, Stine found dozens of tree stumps, mostly cottonwood and Jeffrey pine, rooted in place. They were gnarled and ancient looking and encased in tufa—a whitish gray calcium carbonate crust that precipitates from the briny water of the lake. Clearly the trees had grown when a severe and long-lasting drought had lowered the lake and exposed the land where they had taken root; they had died when a return to a wetter climate in the Sierra Nevada caused the lake to drown them. Their rooted remains were now exposed because Los Angeles had drawn the lake down.

Stine found drowned stumps in many other places in the Sierra Nevada. They all fell into two distinct generations, corresponding to two

distinct droughts. The first had begun sometime before 900 and lasted over two centuries. There followed several extremely wet decades, not unlike those of the early 20th century. Then the next epic drought kicked in for 150 years, ending around 1350. Stine estimates that the runoff into Sierran lakes during the droughts must have been less than 60 percent of the modern average, and it may have been as low as 25 percent, for decades at a time. "What we have come to consider normal is profoundly wet," Stine said. "We're kidding ourselves if we think that's going to continue, with or without global warming."

No one is sure what caused the medieval megadroughts. Today Southwestern droughts follow the rhythm of La Niña, a periodic cooling of the eastern equatorial Pacific. La Niña alternates every few years with its warm twin, El Niño, and both make weather waves around the globe. A La Niña cooling of less than a degree Celsius was enough to trigger the recent drought, in part because it shifted the jet stream and the track of the winter storms northward, out of the Southwest. Richard Seager, of Lamont, and his colleagues have shown that all the western droughts in the historical record,



including the Dust Bowl, can be explained by small but unusually persistent La Niñas. Though the evidence is slimmer, Seager thinks the medieval megadroughts too may have been caused by the tropical Pacific seesaw getting stuck in something like a perpetual La Niña.

The future, though, won't be governed by that kind of natural fluctuation alone. Thanks to our emissions of greenhouse gases, it will be subject as well to a global one-way trend toward higher temperatures. In one talk at Lamont, climate theorist Isaac Held, from NOAA's Geophysical Fluid Dynamics Laboratory in Princeton, gave two reasons why global warming seems almost certain to make the drylands drier. Both have to do with an atmospheric circulation pattern called Hadley cells. At the Equator, warm, moist air rises, cools, sheds its moisture in tropical downpours, then spreads toward both Poles. In the subtropics, at latitudes of about 30 degrees, the dry air descends to the surface, where it sucks up moisture, creating the world's deserts—the Sahara, the deserts of Australia, and the arid lands of the Southwest. Surface winds export the moisture out of the dry subtropics to temperate and tropical latitudes. Global warming will intensify

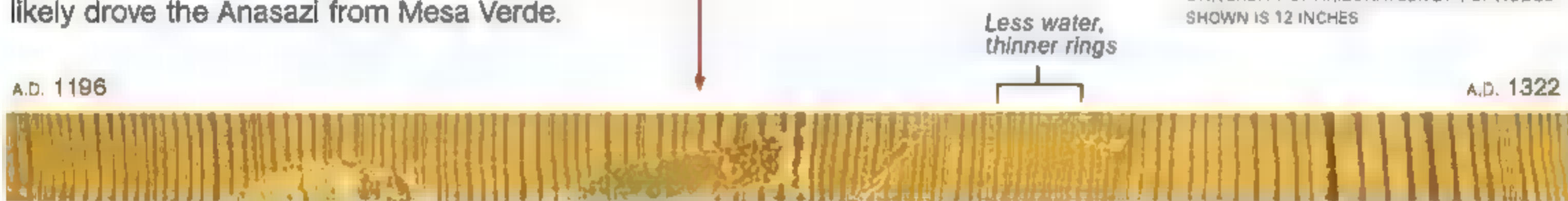
As the West dries out, the landscape is transformed. Without cold winters to kill off their larvae, mountain pine beetles infest up to 90 percent of lodgepole pines in Colorado forests, like this one near Granby (above left). The dead trees raise the risk of wildfires. In much of the West warmer, drier winters have reduced snowpack, a crucial water source. On California's Mount Shasta (above) a hiker traverses a snow patch diminished by milder temperatures.



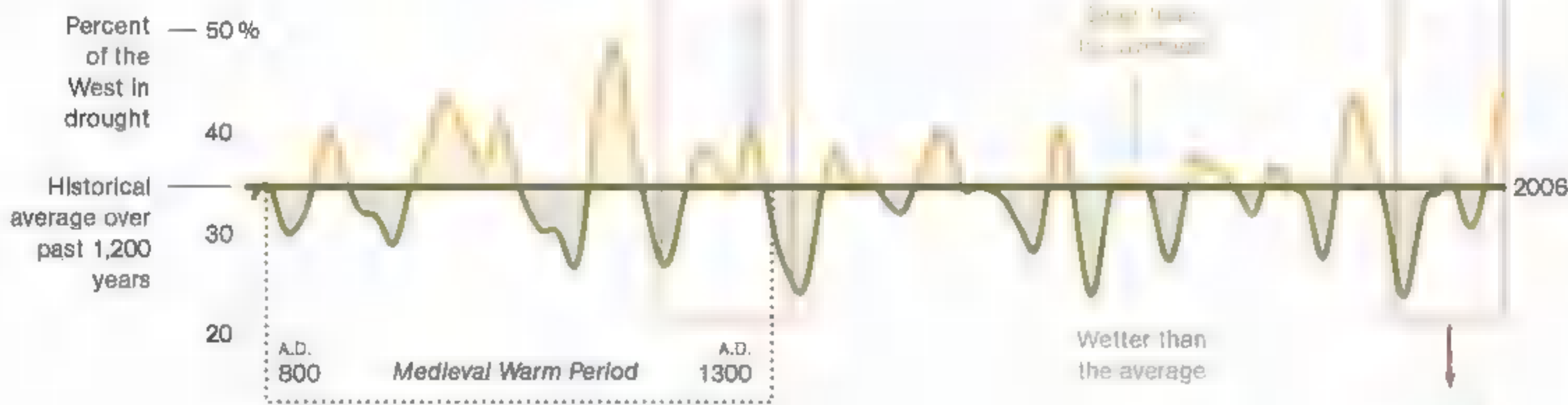
Reading the Rings

Climate patterns of centuries past can be tracked in a tree's annual growth rings: Dry years produce thinner bands than wet years. A wedge from a Douglas fir log (above), collected in Utah's Harmon Canyon, holds the precipitation record of the upper Colorado River Basin from the 10th to 17th centuries A.D. The enlarged section below highlights a decade-long drought in the late 1200s that likely drove the Anasazi from Mesa Verde.

PHOTO: LABORATORY OF TREE-RING RESEARCH, UNIVERSITY OF ARIZONA. LENGTH OF WEDGE SHOWN IS 12 INCHES

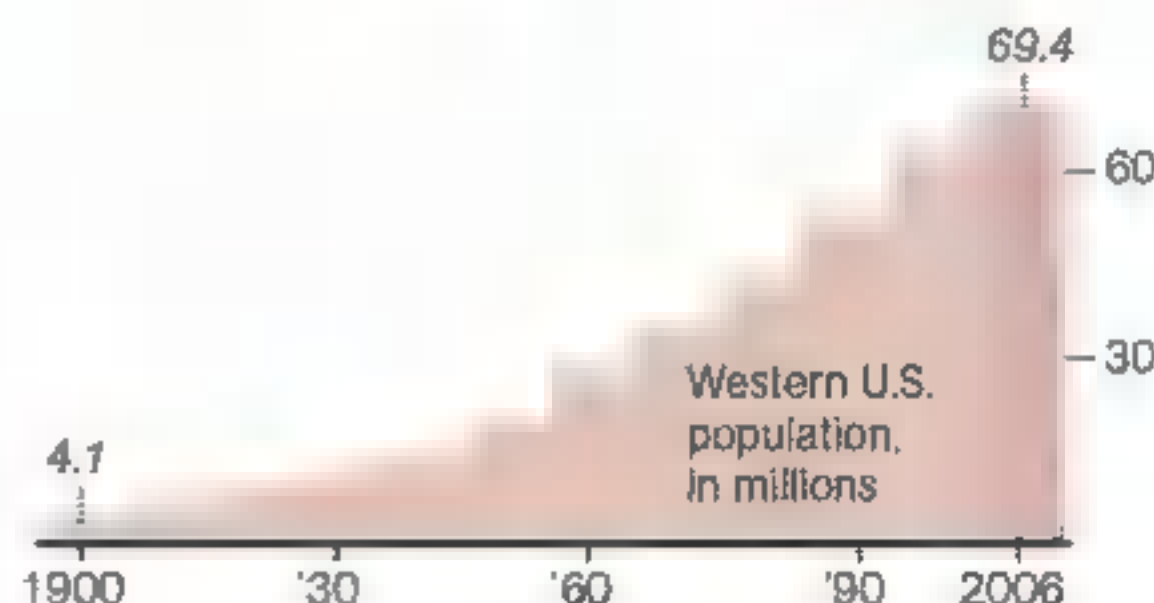


Using tree-ring data from a variety of wood samples from across the West, scientists have graphed the region's climate fluctuations (below), finding the most prolonged droughts during the medieval period, when parts of the world experienced warmer temperatures.

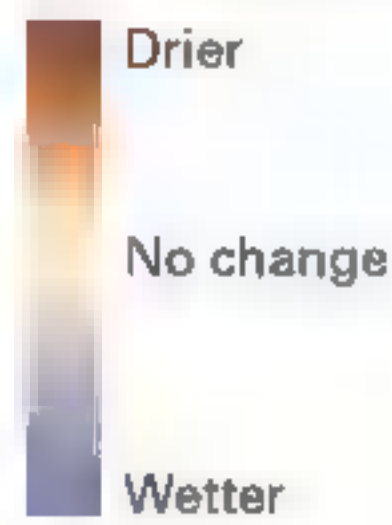


Population Rise in a Wet 20th Century

The unusually wet past century amply met the water needs of a flood of newcomers to the West. But the 21st dawns drier, as population continues to rise.

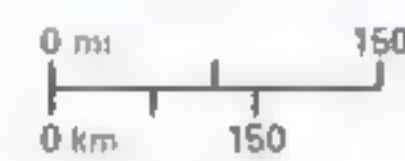


**Precipitation
2000-2006**
(compared with
previous 30 years)



Population

- More than 5 million
- 1 to 5 million
- 100,000 to 1 million
- 25,000 to 100,000



SOURCE: PRISM GROUP, OREGON STATE UNIVERSITY
M. BRODY DITTEMORE, NGM MAPS

Vanishing Rainfall

Over much of the West the recent decline in rain and snow is most apparent in high mountain ranges, which normally receive the bulk of the region's precipitation. From there, rain and snowmelt recharge rivers, reservoirs, and aquifers.

Once and Future Drought

The West is naturally dry, but just how dry it can get is only now being understood. In contrast to the 20th century, revealed by tree rings as the wettest of the past millennium, an era called the Medieval Warm Period was dominated by deep droughts. Those megadroughts lowered the flow of the Colorado River to less than the volume currently drawn from it by 30 million people from Los Angeles to Denver for consumption and irrigation.

Natural cycles of drought in the West, especially the Southwest, are thought to be triggered mainly by the Pacific Ocean phenomenon called La Niña, a pulse of cooler equatorial water that periodically shifts the jet stream and its winter storms to the north. With the effects of La Niña expected to be compounded in coming decades by global warming, the politics of sharing the Colorado—and all western water resources—will only intensify.

the whole process. The upshot is, the dry regions will get drier, and the wet regions will get wetter. “That’s it,” said Held. “There’s nothing subtle here. Why do we need climate models to tell us that? Well, we really don’t.”

A second, subtler effect amplifies the drying. As the planet warms, the poleward edge of the Hadley cells, where the deserts are, expands a couple of degrees latitude farther toward each Pole. No one really knows what causes this effect—but nearly all climate models predict it, making it what modelers call a robust result. Because the Southwest is right on the northern edge of the dry zone, a northward shift will plunge the region deeper into aridity.

As the meeting neared its close, Held and Seager stood out on the lawn, discussing Hadley cells and related matters through mouthfuls of coffee and doughnuts. The two men had lately become collaborators, and a few months before had published with colleagues the sobering *Science* paper analyzing the results of 19 different simulations done by climate modeling groups around the world. They then averaged all these results into an “ensemble.”

The ensemble shows precipitation in the Southwest steadily declining over the next few decades, until by mid-century, Dust Bowl conditions are the norm. It does not show the Pacific locked in a perpetual La Niña. Rather, La Niñas would continue to happen as they do today (the present one is expected to continue at least through the winter of 2008), but against a background state that is more profoundly arid. According to the ensemble model, the descent into that state may already have started.

People are not yet suffering, but trees are. Forests in the West are dying, most impressively by burning. The damage done by wildfires in the U.S., the vast majority of them in the West, has soared since the late 1980s. In 2006 nearly ten million acres were destroyed—an all-time record matched the very next year. With temperatures in the region up four degrees F over the past 30 years, spring is coming sooner to the western mountains. The snowpack—already diminished

by drought—melts earlier in the year, drying the land and giving the wildfire season a jump start. As hotter summers encroach on autumn, the fires are ending later as well.

The fires are not only more frequent; they are also hotter and more damaging—though not entirely because of climate change. According to Tom Swetnam, director of the University of Arizona tree-ring lab, the root cause is the government’s policy, adopted early in the 20th century, of trying to extinguish all wildfires. By studying sections cut from dead, thousand-year-old giant sequoias in the Sierra Nevada and from ponderosa pines all over Arizona and New Mexico, Swetnam discovered that most southwestern forests have always burned often—but at low intensity, with flames just a few feet high that raced through the grasses and the needles on the forest floor. The typical tree bears the marks of many such events, black scars where flames ate through the bark and perhaps even took a deep wedge out of the tree, but left it alive to heal its wound with new growth. Suppressing those natural fires has produced denser forests, with flammable litter piled up on the floor, and thickets of shrubs and young trees that act as fire ladders. When fires start now, they don’t stay on the ground—they shoot up those ladders to the crowns of the trees. They blow thousand-acre holes in the forest and send mushroom clouds into the air.

One day last summer, Swetnam took a few visitors up Mount Lemmon, just north of Tucson, to see what the aftermath of such events looks like. In May 2002 the Bullock fire roared up the northeast slope of Mount Lemmon, consuming 30,000 acres. Firefighters stopped it at the Catalina Highway, protecting the village of Summerhaven. But the very next year, the Aspen fire started on the slope just below the village, destroying nearly half of the 700-odd houses in Summerhaven and burning 85,000 acres, all the way down to the outskirts of Tucson. The entire mountainside beyond the village remains covered with the gray skeletons of ponderosa pines, like one big blast zone. “Ponderosa pine is not adapted to these crown fires,” Swetnam

“Sequoias may not survive in Sequoia National Park. What do you do? Do you irrigate these things? Or do you let a 2,000-year-old tree die?”

—Craig Allen, landscape ecologist

said, contemplating the site from the scenic overlook above the village. “It has heavy, wingless seeds that don’t go very far. When you get a large hole like this, it will take hundreds of years to fill in from the edges.”

Mount Lemmon’s forests are also experiencing a slower, broader change. The Catalina Highway starts out flat, at an altitude of 2,500 feet in the Sonoran Desert, with its saguaros and strip malls. As the road leaves the last of Tucson behind, it climbs steeply through the whole range of southwestern woodland ecosystems—first scrub oak, then piñon and juniper, then ponderosa pine and other conifers, until finally, after less than an hour and a climb of 7,000 feet, you reach the spruce and fir trees on the cool peak. There is a small ski area there, the southernmost in the United States, and its days are certainly numbered.

As Swetnam explained, the mountain is one of an archipelago of “sky islands” spread across southeastern Arizona, New Mexico, Texas, and into Mexico—mountains isolated from one another by a sea of desert or grassland. Like isles in the ocean, these islands are populated in part by endemics—species that live nowhere else. The sky-island endemics are cool- and wet-loving species that have taken refuge on the mountaintops since the last ice age. They are things like the corkbark fir, or the endangered red squirrel that lives only on nearby Mount Graham. Their future is as bleak as that of the

ski area. “They’ll be picked off the top,” said Swetnam. “The islands are shrinking. The aridity is advancing upslope.”

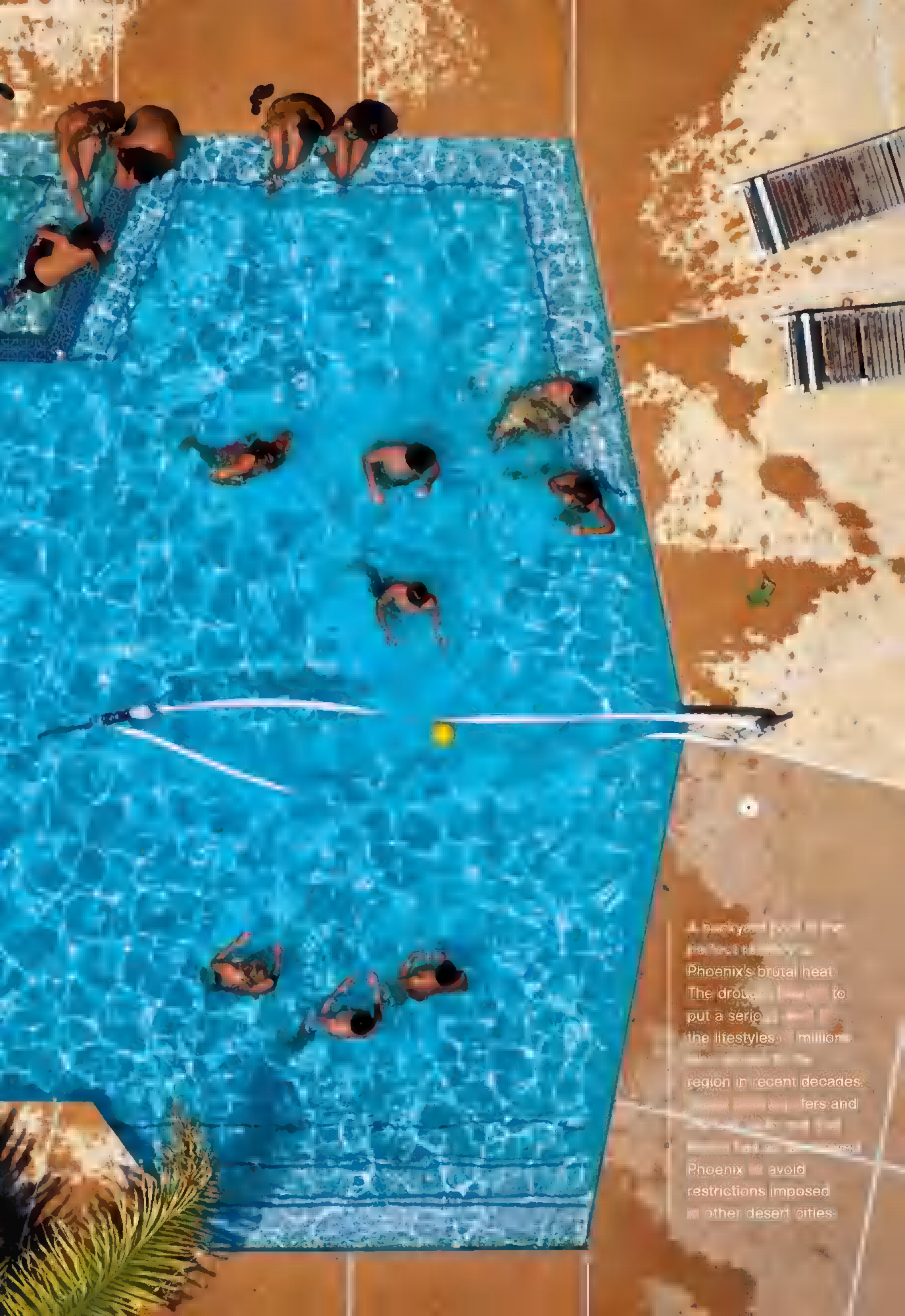
All over the Southwest, a wholesale change in the landscape is under way. Piñons and scrubber, more drought-resistant junipers have long been partners in the low woodlands that clothe much of the region. But the piñons are dying off. From 2002 to 2004, 2.5 million acres turned to rust in the Four Corners region alone. The immediate cause of death was often bark beetles, which are also devastating other conifers. The Forest Service estimates that in 2003, beetles infested 14 million acres of piñon, ponderosa, lodgepole pine, and Douglas fir in the American West.

Bark beetles tend to attack trees that are already stressed or dying from drought. “They can smell it,” says Craig Allen, a landscape ecologist at Bandelier National Monument in the Jemez Mountains of New Mexico. Global climate change may be permanently teasing the piñons and junipers apart, and replacing piñon-juniper woodland with something new. At Bandelier, Allen has observed that junipers, along with shrubs such as wavyleaf oak and mountain mahogany, now dominate the beetle-ravaged landscape: pockets of green gradually spreading beneath a shroud of dead piñons.


Just as there are global climate models, there are global models that forecast how vegetation will change as the climate warms. They predict that on roughly half of Earth’s surface, something different will be growing in 2100 than is growing there now. The models are not good, however, at projecting what scientists call “transient dynamics”—the damage done by droughts, fires, and beetle infestations that will actually accomplish the transformation. Large trees cannot simply migrate to higher latitudes and altitudes; they are rooted to the spot. “What happens to what’s there now?” Allen wonders. “Stuff dies quicker than it grows.”

Over the next few decades, Allen predicts, people in the Southwest will be seeing a lot of death in the old landscapes while waiting for the new ones to be born. *(Continued on page 108)*





A busy pool is the perfect remedy for Phoenix's brutal heat. The drought has led to put a serious dent in the lifestyles of millions in the region in recent decades. ...fers, and ... Phoenix to avoid restrictions imposed on other desert cities.



Center pivot irrigation shifts the geometry of an arable field in the mid San Luis Valley of southern Colorado. More efficient than the flood irrigation it replaced, the technique has allowed agriculture to prosper in dry places across the West. But water shortages have ignited tension between rural and urban users.



"This is a dilemma for the Park Service," he says. "The projections are that Joshua trees may not survive in Joshua Tree National Park. Sequoias may not survive in Sequoia National Park. What do you do? Do you irrigate these things? Or do you let a 2,000-year-old tree die?"

While the trees die, the subdivisions proliferate. "Our job was to entice people to move to the West, and we did a darn good job," says Terry Fulp, who manages water releases at Hoover Dam. The federal Bureau of Reclamation built the dam in the 1930s primarily to supply the vegetable farms of the Imperial Valley and only secondarily to supply the residents of Los Angeles. Farmers had first claim to the water—they still do—but there was plenty to go around. "At Lake Mead, we basically gave the water away," says Fulp. "At the time, it made perfect sense. There was no one out here." After Reclamation built Hoover and the other big dams, more people came to the desert than anyone ever expected. Few of them are farmers anymore, and farming, crucial as it is to human welfare, is now a small part of the economy. But it still uses around three-quarters of the water in the Colorado River and elsewhere in the Southwest.

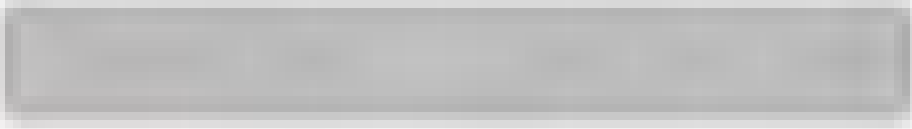
In the wet 1920s, as the dam was being planned, seven states drew up the Colorado River Compact to divvy up 15 million acre-feet of its water. California, Nevada, and Arizona—the so-called Lower Basin states—would get half, plus any surplus from the Upper Basin states of Wyoming, Colorado, New Mexico, and Utah. The compact also acknowledged Mexico's rights to the water. Surpluses were almost always on hand, because the Upper Basin states have never fully used the 7.5 million acre-feet they are entitled to under the compact. They are only entitled to use it, in fact, if in so doing they don't prevent the Lower Basin states from getting *their* 7.5 million—the compact is unfair that way. But in the wet 20th century, it didn't seem to matter.

In 1999 both Lake Mead and Lake Powell—created in 1963 upstream of Lake Mead to ensure that the Upper Basin would have enough

water even in drought years to meet its obligation to the Lower Basin—were nearly full, with 50 million acre-feet between them. Two years later, representatives of the states in the basin completed long and difficult negotiations with the Bureau of Reclamation on new guidelines for dividing up the surpluses from Lake Mead. Then came the drought. Both lakes are now only half full. "Those guidelines are almost a joke now," says the Southern Nevada Water Authority's Pat Mulroy. "All of a sudden, seven states that had spent years in surplus discussions had to turn on a dime and start discussing shortages."

Mulroy, a crisp, tanned, fiftysomething blonde with a tailored look and a forceful personality, has run the Las Vegas water district since 1989. During that time she has watched the area's population growth consistently outstrip demographic projection. The population is almost two million now, having grown by 25 percent during the drought years; Mulroy is convinced it will go to three million. Before the drought, she and her colleagues nevertheless thought their water supply, 90 percent of it from Lake Mead, was safe for 50 years. In 2002 they were celebrating the opening of a second water intake from Lake Mead, 50 feet lower than the old one, which more than doubled their pumping capacity. Now they are scrambling to insert a third "straw" even deeper into the sinking lake. Las Vegas is also trying to reduce its dependence on the Colorado. The SNWA is exercising water rights and buying up ranches in the east-central part of the state. It plans to sink wells and tap groundwater there and pump as much as 200,000 acre-feet of it through a 250-mile pipeline to the city. There is considerable local opposition, of course, and an environmental impact statement must be prepared—but there is "zero chance," Mulroy says grimly, that the pipeline won't be built.

Other southwestern cities are also realizing their vulnerability to drought. Phoenix, hellish as it is in summer and bisected by the dry bed of the Salt River, is better off than most—for the moment. "In 2002 Phoenix was virtually the only city in the Southwest that had no mandatory



The West was built by dreamers. As the climate that underpinned that expansive vision vanishes, the vision needed to replace it has not yet emerged.

restrictions,” says Charlie Ester, water resources manager at the Salt River Project in Phoenix. “We didn’t need them.” Phoenix pumps groundwater whenever it needs to, though it is under ■ state mandate to stop depleting the aquifer. And it gets a little over a third of its water from the Colorado River via the Central Arizona Project, a 336-mile-long canal. But the Salt River remains its biggest source. The riverbed is dry in the city because the SRP has half a dozen dams in the mountains north and east of the city, which convert the Salt and its tributary, the Verde, into chains of terraced lakes.

Phoenix would thus seem to possess that holy grail of water managers: a diversified portfolio. But Ester was still disconcerted to see his lake levels dropping in the drought, until they were less than half full. After he called the tree-ring lab, Dave Meko and climatologist Katie Hirschboeck looked into the tree-ring records for the Salt and Verde Rivers’ watersheds.

“They found they were virtually identical,” Ester says. “There were only three years out of 800 where the Colorado was wet and the Salt was dry or vice versa. What that means is, if we have a bad drought in Arizona, and the Salt dries up, we can’t rely on the Colorado to bail us out. So what are we going to do? Well, we’re going to hurt. Or move.”

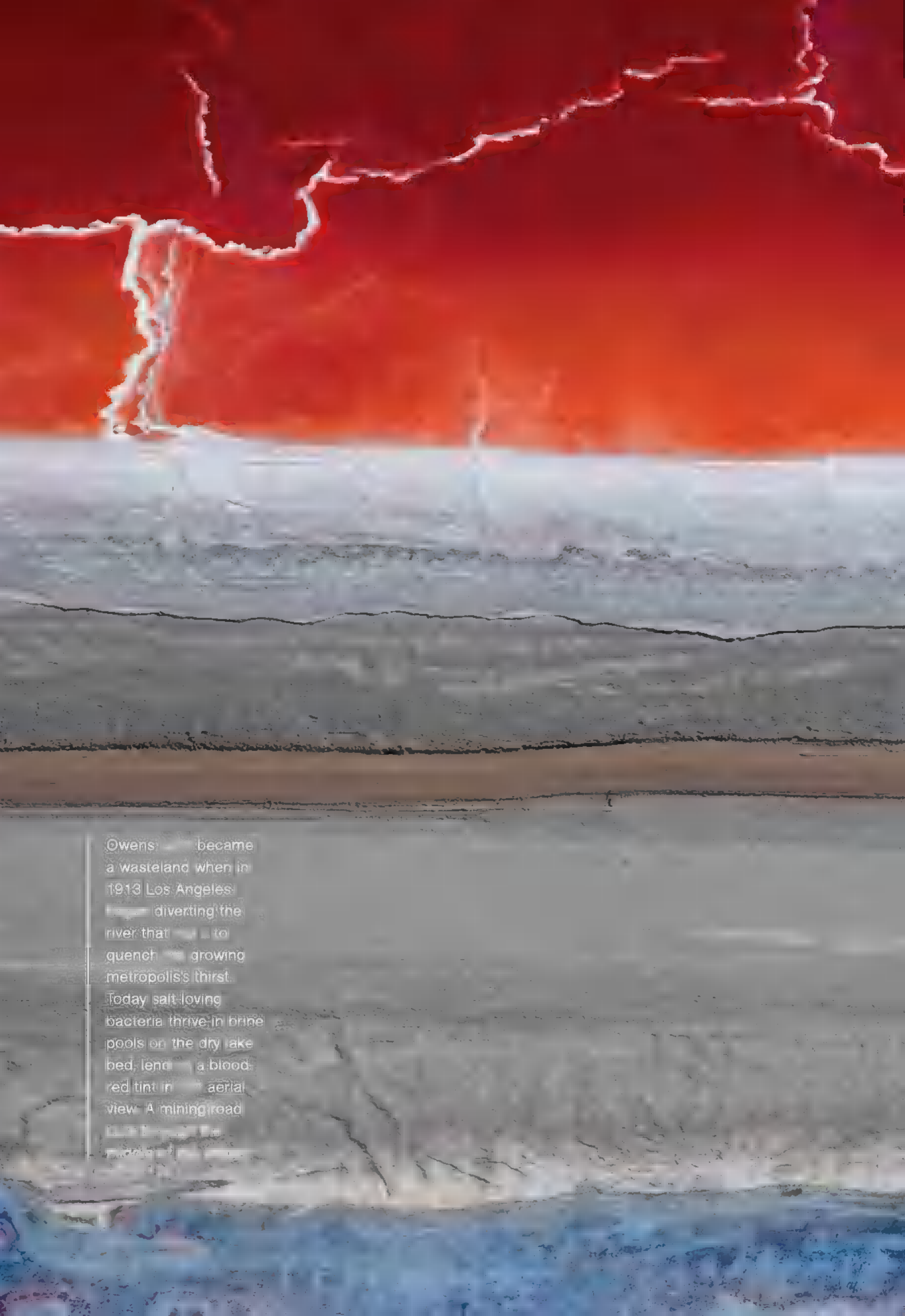
Since the Hoover Dam was built, there has never been a water shortage on the Colorado, never a day when there was simply not enough water in

Lake Mead to meet all the downstream allocations. Drought, and a realistic understanding of the past, have made such a day seem more imminent. Under the pressure of the drought, the seven Colorado basin states have agreed for the first time on how to share prospective shortages. Arizona will bear almost all the pain at first, because the Central Arizona Project, which came on line in 1993, has junior rights. Nevada will lose only a small percentage of its allotment.

Meanwhile California would give up nothing, at least until Lake Mead falls below 1,025 feet, nearly 200 feet below “full pool.” At that point, negotiations would resume. According to Bureau of Reclamation calculations, a return of the 12th-century drought would force Lake Mead well below that level, perhaps even to “dead pool” at 895 feet—the level at which water no longer flows out of the lake without pumping. Reclamation officials consider this extremely unlikely. But their calculations do not take into account the impact of global warming.

Every utility in the Southwest now preaches conservation and sustainability, sometimes very forcefully. Las Vegas has prohibited new front lawns, limited the size of back ones, and offers people two dollars a square foot to tear existing ones up and replace them with desert plants. Between 2002 and 2006, the Vegas metro area actually managed to reduce its total consumption of water by around 20 percent, even though its population had increased substantially. Albuquerque too has cut its water use. But every water manager also knows that, as one puts it, “at some point, growth is going to catch up to you.”

Looking for new long-term sources of supply, many water managers turn their lonely eyes to the Pacific, or to deep, briny aquifers that had always seemed unusable. Last August, El Paso inaugurated a new desalination plant that will allow the city to tap one such aquifer. The same month, the Bureau of Reclamation opened a new research center devoted to desalination in Alamogordo, New Mexico. The cost of desalination has dropped dramatically—it’s now around four dollars per thousand gallons, or as little as \$1,200



Owens became a wasteland when in 1913 Los Angeles diverted the river that used to quench the growing metropolis's thirst. Today salt-loving bacteria thrive in brine pools on the dry lake bed, lending a blood-red tint in an aerial view. A mining road

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PHOTOGRAPH BY [unreadable]





A viable desert home during ■ long wet spell may be uninhabitable when the rains stop. The ancient Anasazi created a flourishing culture in New Mexico's Chaco Canyon, epitomized by Pueblo Bonito (above). Then prolonged drought hit the region in 1130. By the time it ended 30 years later, the Anasazi were gone. Sprawling cities in the present-day Southwest like Scottsdale (above right) grew by the millions during half a century of above-average rainfall. But with no end to the present drying trend in sight, the region faces an uncertain future.

per acre-foot—but that is still considerably more than the 50 cents per acre-foot that the Bureau of Reclamation charges municipal utilities for water from Lake Mead, or the zero dollars it charges irrigation districts. The environmental impacts of desalination are also uncertain—there is always a concentrated brine to be disposed of. Nevertheless, a large desalination plant is being planned in San Diego County. In Las Vegas, Mulroy envisions one day paying for such a plant on the coast of California or Mexico, in exchange for a portion of either's share of the water in Lake Mead. "The problem is, if there's nothing in Lake Mead, there's nothing to exchange," she says.

A more obvious solution for cities facing shortages is to buy irrigation water from farmers. In 2003 the Imperial Irrigation District was pressured into selling 200,000 of its three million acre-feet of Colorado water to San Diego, as part of an overall deal to get California to stop exceeding its allotment. San Diego paid nearly \$300 per acre-foot for water that the farmers in the Imperial Valley get virtually for free. The government favors such market mechanisms, says the Bureau of Reclamation's Terry Fulp, "so people who really want the water get it." At that



price, the irrigation water in the Imperial Valley is worth nearly as much as its entire agricultural revenue, which is around a billion dollars a year. But not everyone favors drying up farms so that more water will be available for subdivisions. The valley is one of the poorest regions in California, yet the richest farmers stand to benefit most from the sale. Many more people fear the loss of jobs and, ultimately, of a whole way of life.

The West was built by dreamers. The men who conceived Hoover Dam were, in the words beneath a flagpole on the Nevada side, “inspired by a vision of lonely lands made fruitful.” As the climate that underpinned that expansive vision vanishes, the vision needed to replace it has not yet emerged. In a drying climate, the human ecosystems established in a wetter one will have to change—die and be replaced by new ones. The people in the Southwest face the same uncertain future, the same question, as their forests: What happens to the stuff that’s there now?

In the second half of the 13th century, as a drying trend set in, people who had lived

for centuries at Mesa Verde moved down off the mesa into the canyons. They built villages around water sources, under overhangs high up in the walls of the cliffs, and climbed back up the cliffs to farm; their handholds in the rock are still visible. Some of the villages were fortified, because apparently their position on a cliff face was not defense enough. Those cliff dwellings, abandoned now for seven centuries but still intact and eerily beautiful, are what attract so many visitors today. But they are certainly not the product of an expansive, outward-looking civilization. They are the product of a civilization in a crouch, waiting to get hit again. In that period, the inhabitants of the Mesa Verde region began carving petroglyphs suggesting violent conflict between men armed with shields, bows and arrows, and clubs. And then, in the last two or three decades of the century, right when the tree rings record one of the most severe droughts in the region, the people left. They never came back. □

🔗 **Water Woes** See more images of the causes and consequences of drought at ngm.com.

By Phil Zabriskie
Photographs by Steve McCurry

The Outsiders

*Set apart by geography
and beliefs, oppressed by
the Taliban, the **Hazara**
people could be
Afghanistan's best hope.*

*Born to Hazara
parents who escaped
to Iran, 12-year-old
Fiza and her family
have returned to
Afghanistan "to be
in our own country,"
says Amin, her father.*







Hazara potato farmers in Bamian Province head to work beneath a gaping reminder of things lost. Towering 1,500-year-old stone Buddhas, possibly carved by Hazara ancestors, once stood sentry in the limestone cliffs. The Taliban demolished them in 2001.



At the heart of Afghanistan is an empty space, a striking absence, where the larger of the colossal Bamian Buddhas once stood. In March 2001 the Taliban fired rockets at the statues for days on end, then planted and detonated explosives inside them. The Buddhas had looked out over Bamian for some 1,500 years. Silk Road traders and missionaries of several faiths came

and went. Emissaries of empires passed through—Mongols, Safavids, Moguls, British, Soviets—often leaving bloody footprints. A country called Afghanistan took shape. Regimes rose and collapsed or were overthrown. The statues stood through it all. But the Taliban saw the Buddhas simply as non-Islamic idols, heresies carved in stone. They did not mind being thought brutish. They did not fear further isolation. Destroying the statues was a pious assertion of their brand of faith over history and culture.

It was also a projection of power over the people living under the Buddhas' gaze: the Hazaras, residents of an isolated region in Afghanistan's central highlands known as Hazarajat—their heartland, if not entirely by choice. Accounting for up to one-fifth of Afghanistan's population, Hazaras have long been branded outsiders. They are largely Shiite Muslims in an overwhelmingly Sunni Muslim country. They have a reputation for industriousness yet work the least desirable jobs. Their Asian features—narrow eyes, flat noses, broad cheeks—have set them apart in a de facto lower caste, reminded so often of their inferiority that some accept it as truth.

The ruling Taliban—mostly fundamentalist Sunni, ethnic Pashtuns—saw Hazaras as infidels, animals, other. They didn't look the way Afghans should look and didn't worship the way Muslims should worship. A Taliban saying about Afghanistan's non-Pashtun ethnic groups went: "Tajiks to Tajikistan, Uzbeks to Uzbekistan, and Hazaras to *goristan*," the graveyard. And in fact, when the Buddhas fell, Taliban forces were besieging Hazarajat, burning down villages to render the region uninhabitable. As autumn

began, the people of Hazarajat wondered if they'd survive winter. Then came September 11, a tragedy elsewhere that appeared to deliver salvation to the Hazara people.

Six years after the Taliban fell, scars remain in the highlands of the Hazara homeland, but there is a sense of possibility unthinkable a decade ago. Today the region is one of the safest in Afghanistan, mostly free of the poppy fields that dominate other regions. A new political order reigns in Kabul, seat of President Hamid Karzai's central government. Hazaras have new access to universities, civil service jobs, and other avenues of advancement long denied them. One of the country's vice presidents is Hazara, as is parliament's leading vote getter, and a Hazara woman is the first and only female governor in the country. The best-selling American novel *The Kite Runner*—now a feature film—depicted a fictional Hazara character, and a real Hazara won the first *Afghan Star*, an *American Idol*-like program.

As the country struggles to rebuild itself after decades of civil war, many believe that Hazarajat could be a model of what's possible not just for Hazaras but for all Afghans. But that optimism is tempered by past memories and present frustrations—over roads not built, a resurgent Taliban, and rising tides of Sunni extremism.

A project is now under way to gather thousands of stone fragments and rebuild the Buddhas. Something similar is occurring among Hazaras as they try to repair their fractured past, with one notable difference: There are pictures of the destroyed Buddhas. The Hazaras have no such blueprint, no sense of what a future free from persecution is supposed to look like.



Urban Hazaras in Kabul often live in an awli, or enclosed household, shared by the extended family. Her children near, Marziya Hamdard tends to daily chores, heating water in the wood-fueled samovar.

Musa Shafaq wants to live in that future. He is 28, with shoulder-length black hair and typical Hazara features, not unlike those of the Bud-dhas. He stands at the gate of Kabul University in a red sweater, black jeans, and tinted prescription glasses. Classes are out for the day. In two months, he will graduate, a notable achievement for any Afghan given the country's instability. Because he is Hazara, his success signals a new era. Shafaq is poised to finish at the top of his class, which should guarantee him the job he most wants, a teaching post at Kabul University.

"The Hazaras are producing the most enthusiastic, educated, forward-looking youth, who are seizing the opportunities provided by the new situation," says Michael Semple, a red-bearded Irishman who serves as the deputy to the special representative of the European Union in Afghanistan. Shafaq helped found the

Phil Zabriskie has reported extensively in Afghanistan for Time magazine. Steve McCurry has shot for National Geographic for over 20 years and is best known for his 1985 cover photo of an Afghan girl.

Center for Dialogue, a Hazara student organization with 150 members. The group publishes its own magazine, holds events promoting “humanism and pluralism,” and works with human rights organizations to monitor elections. Semple deems the group part of an emerging political consciousness among Hazara youth.

“We have a window of opportunity,” Shafaq says, “but we are not sure how long it will remain open.” This son of Hazarajat is the proverbial country boy who came to the big city and made good. Shafaq’s father farmed in their village, Haft Gody, in Waras, a district in southern Bamian, and ran a restaurant in the district center. Children in Waras customarily marry young, stay close to home, and tend the potato fields. But Shafaq wanted something more. When he wasn’t helping his father, he read voraciously—novels, history, philosophy, translations of Abraham Lincoln, John Locke, and Albert Camus.

Growing up, Shafaq heard the stories of where his people came from, why they looked different from Pashtuns and Tajiks. He and his fellow Hazaras, the story goes, are the descendants of Genghis Khan’s Mongolian soldiers, who marched into central Afghanistan in the 13th century, built a garrison, and conquered the inhabitants—a varied mix of peoples not uncommon along the Silk Road. When the locals rose up and killed Genghis’s son, the conqueror retaliated by leveling Bamian and wiping out most of its residents. Those who survived intermarried with the Mongolian invaders and became the Hazaras—a genetic collaboration evident in the diversity of facial features among the region’s people today.

In recent times a minority of Hazaras have embraced the Genghis connection as a point of pride, but more often the outsider lineage has been used against them. For many the modern-day narrative starts in the 1890s, when King Abdur Rahman, a Pashtun, launched bloody anti-Hazara pogroms in and around Hazarajat. Fueled by chauvinism, armed with fatwas from Sunni mullahs who declared the Hazaras infidels, Rahman’s forces killed many thousands and took slaves from among the survivors. Throngs of

Hazaras were driven from lowland farms up into the central highlands. Later rulers used force, law, and manipulation to keep the Hazaras confined, physically and psychologically, to those highlands.

Accounts of the Hazaras’ dark history have been passed down through generations, a cultural inheritance of sorts. “It was an embarrassment for Hazara people to show their ethnicity,” recalls Habiba Sarobi, Bamian’s governor. Mohammed Mohaqeq, the former Hazara commander who received the most votes in the 2005 parliamentary elections, says, “We were like donkeys, good for carrying things from one place to another.”

Shafaq was in tenth grade when the Taliban rose to power in 1996, promising security to a populace tired of the bitter conflict among ethnic warlords, including Hazara factions. A year earlier, the Taliban had brutally murdered Abdul Ali Mazari—a charismatic leader sometimes called the father of the Hazara people—who had helped found “the party of unity,” or Hezb i Wahdat, in an effort to stop the infighting among Hazaras. After his death, the party splintered, and Taliban forces soon spread across Hazarajat.

“I was working with my father in the field when my sister ran to us and said, ‘The Taliban are everywhere,’” Shafaq says. Villagers fashioned white flags from bags of fertilizer. Local leaders struck deals to appease the Taliban. Shafaq hid his books.

It was an ugly war. In Bamian Province, Wahdat fighters hoped to prevent the Taliban from taking the few parts of the country they’d yet to conquer. Schools closed. Crops lay unattended. Families fled for Iran or for the hills. The Taliban imposed a blockade on Hazarajat, prompting food shortages in a region already suffering from drought. In Bamian, the bazaar was torched and scores of families sought sanctuary in the caves near the Buddhas.

In early 2001, in the coldest days of a brutal Hazarajat winter, the horror came to the district of Yakawlang. On January 8, the Taliban rounded up young Hazara men in Nayak, the district center. “People were thinking they would be



In the 1890s Hazaras were driven from lowland farms into the unforgiving terrain of Afghanistan's central highlands. Called Hazarajat, the region remains their homeland today, though many have left for Kabul or other cities in search of work.



taken to court," recalls Sayed Jawhar Amal, a teacher in the nearby village of Kata Khona. "But at 8 a.m. they were killed. All of them." The men were lined up and shot in public view. When elders from Kata Khona inquired about young men from their community, they were also killed. In all, Human Rights Watch concluded, more than 170 were executed in four days. "Because we were Shia. That was the only reason," says Mohsin Moisaqid, 55, of Kata Khona, who lost two brothers that day.

Local leaders got permission to bury the bodies. The frozen corpses had to be separated

with boiling water. Two weeks later, the fighting started anew. According to Human Rights Watch, Taliban forces burned down more than 4,000 homes, shops, and public buildings. They destroyed entire towns in western Bamian Province. Villagers fled into the mountains, then looked down and watched their homes burn.

Many took sanctuary in Waras, where Shafaq's family—mother, father, and seven siblings—were struggling to find food. Shafaq stopped studying and started teaching—Hazarajat schools today are full of (Continued on page 126)





"I miss the green land," says city resident Safar Ali of his rural home in Behsud. But "for me it's good in Kabul. Here there is work." For nine years the 31-year-old has put in 12-hour days at his stepbrother's candy factory, making the equivalent of about \$65 a month.

Man power turns ropes of sugar paste into rows of a hard candy called sherni—more than a thousand pounds a day. Conditions in the Kabul factory are unsanitary; owner Ramatullah (right) must pay bribes to stay open. “We hope our children will have other options,” he says.





teachers who didn't finish grade school. But his dreams were fading. "I was not very hopeful because I was thinking the Taliban will stay for another 10 or 20 years," he says.

The Taliban's onslaught was at its peak when planes crashed into the World Trade Center and the Pentagon. It was a *deus ex machina*, says Michael Semple, who documented, at great personal risk, the 2001 Yakawlang massacre. After U.S. forces drove the Taliban from power, expectations rose. The Hazaras, in particular, thought deliverance was at hand. "I've operated in the days when Hazaras felt they were virtually faced with an apartheid system," Semple says. "Now it's a totally different kettle of fish."

But it is hard for Hazaras like Shafaq to trust this moment. "I would like to see a place where the dreams of young people are attainable," he says, "where there is a church and a Hindu temple, where other religions can exist. That is the aim of pluralism." He dreams of the teaching job at Kabul University and of marrying a woman back home. She is the daughter of family friends, a Sayed Shiite who traces her lineage to the prophet Muhammad. Sayed families do not customarily let their daughters marry Hazara men. But in this new era, maybe it is possible.

From the sky, Hazarajat is a slide show of stunning landscapes: The purple-hued canyonlands around Bamian, the deep blue waters of Band-e Amir Lake, cloud-piercing peaks rising from mountain passes near Waras. On the ground, it's a different story. For those who live here, this is a hard land with a hard history, from which they must wring a life.

A Hazarajat winter, once it arrives, stays for six months. The snow renders roads impassable even with four-wheel drive and tire chains, and closes the high mountain passes that separate districts. Despite promises, years ago, by the government and international donors to pave the roads from Kabul to Bamian and Bamian to Yakawlang, most are still glorified mule tracks. In winter greater numbers of women die in childbirth because they can't get help in time.

Even in the best of weather, farmers can't get crops to market. "We tried taking melons and peaches to Kabul, and it was juice by the time we got there," says Chris Eaton, CEO of the Aga Khan Foundation's Afghanistan office.

Mohammed Akbar is a Hazara farmer with gray-blue eyes that match his tightly wound turban and an elfin face ringed by a white beard. He lives in Lorcha, a speck of a place in western Yakawlang. On a bluff above a narrow stream, mud-walled homes cling together in tightly packed clusters. These houses are among those the Taliban burned down in 2001. Every man in Lorcha can point to the mountain his family fled to and describe arduous journeys through thick snow lugging whatever they could carry. Today most damaged homes have been rebuilt. The villagers donated funds for a new mosque too. Money is short, but the village elder has persuaded farmers to resist the temptation to grow poppies. "It is *haram*," says Akbar, forbidden by Islam.

As the snow began melting last spring, some areas suffered deadly flooding. But Akbar—all of Hazarajat, really—hoped the runoff signaled the end of a punishing drought that had limited crop yields and forced many families to sell animals in recent years. On a mild, late spring day, Akbar irrigated a small plot of wheat just outside the village. The surrounding valley was a patchwork of similar fields filled with potatoes, hay, and wheat in early stages of growth. The nearest road was on the other side of the stream. A footbridge leading to the road had washed away when the stream swelled with runoff from melting snow. Three logs had been laid over the water, and parents piggybacked their children across on their way to school.

In this tiny hamlet and throughout Hazarajat, education is a priority. Even if the school is a tent or a building with no doors or windows, even if the teacher has only a few years of schooling, parents want their kids to study, far more so than elsewhere in the country. Hussain Ali lives in a cave in Bamian, where his family sleeps on thin bedrolls and the walls are



A message of hope rolls along Mazari Road in the Dasht-e Barchi neighborhood in western Kabul. Poverty-stricken and lacking electricity or running water, the area is home to a large Hazara enclave of rural migrants and refugees who fled to Iran and Pakistan in the 1990s to escape oppressive Taliban rule.

**The discrimination Hazaras face in Kabul could
be fueling a long-elusive sense of unity—
and a desire for democracy.**



Isolation and bitter winters define Hazarajat villages like Qala-e Sabzi. But the harsh land is integral to this nomadic herder culture with deep roots in high pastures. “Koh-o mar-domon moya,” saying goes: “The mountains are our people.”



blackened with soot. His children could bring in extra income, but he wants them in school. "I'm old, my time has passed," he says, "but my children should learn something."

Scores of schools have been built in Hazarajat in recent years, mainly by aid agencies and the Bamian-based Provincial Reconstruction Team operated by New Zealand. In Daykundi's provincial capital, a group of teenagers said young people are refusing to marry until they finish school. Hazara high schoolers make up more than a third of those who take the university entrance exam, and the number—including the number of girls—is rising. Hazarajat is a deeply conservative place, but it is far from fundamentalist. Women here "go to school, they have their own pursuits, and they have their freedom," says Ryhana Azad, a female district council member in Daykundi.

In time, perhaps, these seeds will bear fruit the whole society can sample, but for now families must address immediate concerns. Often that means going where the work is. In village after village you see women—wearing long skirts, blouses, and head scarves in greens, reds, and sky blues—shoveling snow off their roofs or harvesting fields by themselves, because the men are working as day laborers in Pakistan or Iran or Herat or Kabul. It's hard on those who go and hard on those who stay behind. But sometimes adapting to the landscape means finding a new one.

For many that new place is Kabul, where some 40 percent of the population is now Hazara. On neighborhood streets in the western part of the city, you see Hazara children in uniform going to school, Hazara vegetable vendors setting up their carts, and Hazara shop owners and tailors opening stores. Hossein Yasa, the editor of the *Daily Outlook* newspaper, notes that there are Hazara-owned television stations, Hazara-owned newspapers, and a huge Shiite madrassa and mosque complex under construction. "The middle class of Hazaras is growing very fast," Yasa says.

Watching from the sidelines, however, is a

huge Hazara underclass made up of manual laborers living in west Kabul neighborhoods—Dasht-e Barchi, Kart-e She, and Chindawul—that have neither electricity nor clean water. "You are talking about ghettos," says Niamatullah Ibrahim, a fellow with the London School of Economics.

Every day, the Hazara cart pullers are out on the main road of Dasht-e Barchi, wondering if they'll get any work. Sunup, sundown, winter, spring, summer, fall, they wait, hoping someone will hire them to use their carts to transport lumber, building materials, bags of wheat, cans of cooking oil, panes of glass, window frames, dishes for wedding receptions—something, anything—from one place to another.

Pahlawan, Baba, and Assadullah are three of many men doing this because they must, because it's all they know. They think themselves invisible, unseen, but in many ways they're the public face of Hazaras in Kabul, doing the jobs no one else wants. On a good day they'll earn 200 or 250 afghanis, four or five dollars. But they can never count on a good day. Pahlawan, "the wrestler," is the strongest, in his mid-30s, working since he was seven. "Every day we sit with our carts from morning to evening," he says. Zulfikar Azimi is "Baba," 67, with a glass eye and missing fingers on one hand. "I have never had a moment of comfort in this life," he says. Assadullah is the youngest, quiet, handsome under all the dust. He recently returned from Iran. He is lean but moves stiffly. In his 20s, he says he used to be an expert martial artist. "Now," he says, "I have this cart."

The first job of the day is from a man who needs 20 bags of plaster moved to a work site. Pahlawan has wandered off, so Baba and Assadullah load the bags, 77 pounds each. Both men grasp the cart's bar, pulling roughly 1,500 pounds as cars and buses honk and spit fumes. Seven minutes and several hundred yards later, they turn into the mud-walled warrens of Kabul's backstreets. Breathing heavily, sweating profusely, they reach the site. They'll have to carry the bags the last 30 feet. Baba throws a



Teaching the young has paid off in Hazara society, where literacy is above the national average. Boys—like these fifth graders at an all-boys school in Bamian—still fill the majority of classrooms. But at least 40 percent of the Hazara students taking college entrance exams are now women.

The Taliban saw Hazaras as infidels, animals, other.

They didn't look the way Afghans should look, and they didn't worship the way Muslims should worship.

His family is poor, his clothes used. But 15-year-old Ali Aqa isn't deterred: He plans to be a lawyer. Childhood memories include Taliban occupation of his village in Bamian. "They burned everything, even my school," he says. "I pray to God no regime like that comes again."





bag over his shoulder and walks stooped over, head down, holding the bag with one hand, white powder spilling on his clothes. Another ten minutes and they're done. Baba and Assadullah get \$1.20, to split.

"You see our situation, at my age," says Baba, turning his head so I see his good eye. He pulls out a snuff tin, puts a handful in his mouth before heading back to see if another job comes.

Some observers believe the discrimination Hazaras face in Kabul could be fueling a long-elusive sense of unity—and a desire for democracy. "I think there is a greater degree of Hazara nationalism in Kabul as compared with rural Hazarajat because people are experiencing this disparity between Hazara and non-Hazara in their day-to-day lives," says Ibrahim. The director of the Afghan Independent Human Rights Commission, Sima Samar, agrees: "The Hazaras are more adaptable to democracy, because they feel the pain more than the others. They feel the discrimination. They really want equality and social justice."

Were the Buddhas still standing last May, they would have gazed down on a young man walking Bamian's main street, a bumpy unpaved tract with shops on both sides selling cooking oil, medicines, and building materials. A large billboard depicting Mazari, the martyred Hazara leader, stands on a hillside.

Musa Shafaq is back in the Hazara heartland. He did not get the job at Kabul University he wanted. "If I am going to live in Afghanistan, it should be in Kabul," he says. His stellar academic record should have made that possible. "He was one of the brightest students. He should have been recruited," says Issa Rezai, an adviser at the Ministry of Higher Education. But prejudice against Hazaras remains high at the university. Fundamentalist Pashtun professors still predominate, including some hard-core

fundamentalists who led factions accused of atrocities against Hazara civilians. Sayed Askar Mousavi, author of *The Hazaras of Afghanistan*, says such discrimination underscores how little has fundamentally changed. In Bamian, he says, "there are two changes. There were two Buddhas, and now there are none."

Shafaq has had other bad news as well: He will not be able to marry his girlfriend back in Waras. "I love her and she loved me," Shafaq says, but "when I sent my mother to ask for her hand from her father, he refused. Because I am a Hazara."

And so, Shafaq is alone, back in Hazarajat, teaching at Bamian University, where all the other teachers are also Hazaras. Like their students, they are earnest, motivated, intelligent—and a bit fearful. Since reopening in 2004, the university has grown. Beyond the entrance is a dusty courtyard where groups of smartly dressed male and female students, books in hand, make their way to class. The sign on the front of the school is written in three languages—in English and in Dari, the most common language in Afghanistan, and then in Pashtu, the language of the Pashtuns, in the largest script.

Shafaq teaches the history of Afghanistan during the enlightenment and the industrial revolution, expounding on John Locke and Abraham Lincoln, on liberty and democracy. His salary is 2,000 afghanis a month, about \$40.

After so much hope, so many promises, the Hazaras are feeling ignored by the new government—led as it is by a Pashtun president. Across Hazarajat, the question echoes: Why has there not been more development and more interest in an area that is safe, where the population supports the government, where corruption is not widespread, where women play a role in public life, where poppies are not proliferating? It's not uncommon to hear farmers muse about growing poppies to sell on the heroin market, maybe even causing a little violence, because they think that might draw the government's attention.

Construction is not easy in this terrain,

➤ **Hope for Hazaras** View more of Steve McCurry's portraits of Afghanistan's ethnic Hazara at this pivotal moment in their history at ngm.com.



Lacking job choices, many Hazaras still pull carts—as much as 1,500 pounds of goods “for bread and tea,” says one man. Yet neither poverty nor prejudice has quashed dreams of a better road ahead.

granted, but Hazarajat could be a model of what’s possible when a region buys into the nation-building process. Yet so much time has passed. Already, the resurgence of the Taliban, who recently have targeted Hazara leaders in several districts abutting their southern strongholds, is stirring difficult memories. “Anytime we hear news of the Taliban on the radio, our bones turn to water,” says Mohsin Moisaifid in Kata Khona.

Perhaps a new generation of Afghan leaders will emerge to finally lead people beyond the

mindset of war and warlords and jihad. Much depends on whether the Taliban will continue to grow, whether the international community will lose interest, whether the tensions between the U.S. and Iran, fellow Shiites, will adversely affect the Hazaras. Whatever happens, much more than the fate of the Hazara people is at stake. As Dan Terry, an American aid worker who has lived in Afghanistan for 30 years, puts it: What happens to the Hazaras is “not just the story of this people. It’s the story of the whole country. It’s everybody’s story.” □



BY HOWARD NORMAN

PHOTOGRAPHS BY MICHAEL YAMASHITA

ON THE TRAIL OF A GHOST



Footsteps fall softly
Following the path
Of Japan's haiku master.

"The road gods beckoned." Thus the poet Matsuo Basho (left) set off in 1689 into Japan's backcountry. His journal, *Narrow Road to a Far Province*, described a path, still visible on Natagiri Pass, that devotees have followed ever since.



Basho celebrated the gauzy green of newly planted rice fields in spring in a haiku—a short, chant-like poem with nature at its heart. “One whole paddy field / Was planted ere I moved on / From that willow tree!”

“Each day is a journey, and the journey itself home,” the poet Matsuo Basho wrote

more than 300 years ago in the first entry of his masterpiece, *Oku no Hosomichi*, or *Narrow Road to a Far Province*. The words are on my mind as I prepare to walk in the footsteps of this revered poet, along his narrow road—the 1,200-mile route he followed through Japan in 1689. I confess that even to imagine doing so is a bit daunting. My late friend Helen Tanizaki, a linguist born and raised in Kyoto, told me, “Everyone I went to school with could recite at least one of Basho’s poems by heart. He was the first writer we read in any exciting or serious way.” Today thousands of people pilgrimage to Basho’s birthplace and burial shrine and travel parts of Basho’s Trail. After three centuries his *Narrow Road*, in print in English and many other languages, still speaks to readers around the world.

Given the pernicious clamor and uncertainties of our own times, it’s easy for a modern reader to identify with the vague unease that Basho sometimes complained of. Whatever its source—Basho lived a turbulent life in a changing Japan—his melancholy was an intensifying element in much of his writing and an important part of what, in the end, propelled him on his journeys.

Howard Norman’s fiction includes The Bird Artist and Devotion, published last year. Michael Yamashita has photographed 20 stories for National Geographic, many from East Asia.

Few details are known about Basho’s early life, but he is thought to have been born in 1644 in the castle town of Ueno, southeast of Kyoto. His father, a minor samurai, may have earned his keep teaching children to write. Many of Basho’s siblings probably became farmers.

Basho, however, acquired a taste for literature, perhaps from the son of the local lord, whose service he joined. He learned the craft of poetry from Kigin, a prominent Kyoto poet, and early in his life was exposed to two lasting influences: Chinese poetry and the tenets of Taoism. After his master died, Basho began spending time in Kyoto, practicing a form called *haikai*, consisting of linked verses.

In Basho’s time, the first verse in *haikai* was evolving into a poetic idiom of its own—haiku, whose unrhymed phrases of five, seven, and five syllables are meant to capture the essence of nature. Basho published his first haiku under various names, each having some personal significance. One, Tosei, or “green peach,” was an homage to the Chinese poet Li Po (“white plum”).

In his late 20s Basho moved to Edo (now old Tokyo), a newly established city in great social flux, with a fast-growing population, robust trade, and, for Basho, literary opportunity. Within a few years he had gathered the coterie of students and patrons who formed what came to be known as the Basho School.

In 1680 one of his students built the poet a small house near the River



PACIFIC OCEAN

Sea of Japan (East Sea)

A BASHO'S TRAIL

HONSHU



ART BY MIKE HEALAN
 CHARLES BERRY, MARTIN GAMACHE
 AND LISA R. TUFER, NGMI MAPS

In middle age, his health delicate, his spirit restless, Basho covered 1,200 miles, mostly on foot, in northern Honshu Island. Though a celebrated poet, Basho yearned for a simple life. On the trail he dressed as a Buddhist monk, perhaps wearing straw-and-cotton sandals like ones still used at a Zen retreat (below).

Sumida, and soon after, when another presented him with a stock of *basho* tree (a species of banana), the poet started writing under the name that has endured: Basho. Credible accounts of his life hold that during this period he was plagued with spiritual doubt and took up the study of Zen Buddhism. His despair only deepened in 1682, when his house burned to the ground in a fire that obliterated much of Edo. He wrote:

*Tired of cherry,
Tired of this whole world,
I sit facing muddy sake
And black rice.*

In 1684 Basho made a months-long journey westward from Edo, which occasioned his first travel account, *Journal of a Weather-Beaten Skeleton*. In Basho's day travel was by foot and lodging was primitive. But despite these rigors he set out again in 1687 and a third time in 1687-1688, journeys recounted in *Kashima Journal and Manuscript in a Knap-sack*. Both were written in a genre that Basho profoundly refined—*haibun*, a mixture of haiku and prose. The poetic travel works and the strenuous sojourns that inspired them added luster to Basho's reputation.

Yet in the autumn of 1688, in his mid-40s, Basho confided to friends



that he still felt the world was too much with him. Exhausted from the incessant demands of students and of his literary celebrity, he said that he “felt the breeze from the afterlife cross his face.” He began planning a pilgrimage to sites important for their literary, religious, or military history—places he wanted to see before he died. He intended to leave that winter, but his friends, worried about his frail health, begged him to wait until spring.

Finally, in May 1689, accompanied by his friend and disciple Sora and carrying only a backpack, writing materials, and changes of clothing, Basho set out, deter-

mined yet again to become a *hyohakusha*—“one who moves without direction.” He walked for five months through the uplands and lowlands, villages, and mountains north of Edo and along the shores of the Sea of Japan. It was this wonderfully episodic sojourning that produced his masterwork, *Narrow Road to a Far Province*. “It was as if the very soul of Japan had itself written it,” said the early 20th-century Buddhist poet Miyazawa Kenji.

The book is a spiritual journey, synonymous with taking a Buddhist path, shedding all worldly belongings and casting fate to the winds. But



A watery moon rises above Nanko lake, reminiscent of the moon views that Basho extolled. Comparing himself to a windblown cloud, he wandered for five months, from spring through fall, exulting in almost every view.

the physical journey had a practical side: Basho made his living in part as a teacher, and as he traveled, any number of far-flung disciples were happy to host the master and receive lessons in poetry.

In 1694, the year of Basho's death, the famed calligrapher Soryu wrote in an epilogue to the *Narrow Road*: "Once had my raincoat on, eager to go on a like journey, and then again content to sit imagining those rare sights. What a hoard of feelings, Kojin jewels, has his brush depicted! Such a journey! Such a man!"

In the intervening centuries, Basho has become many things to many people—bohemian sage, outsider artist, consummate wayfarer, beatific saint, and above all a poet for the ages. In his *Narrow Road*, Basho seamlessly plaits together self-deprecating humor, logistical detail, Buddhist compliance, painterly description, and even raunchy complaint ("Fleas and lice biting; / Awake all night / A horse pissing close to my ear"). At the same time, his book provides a kind of timeless spiritual map for the traveler. Helen Tanizaki once characterized Basho this way: "He's like a quirky philosopher tour-guide who pretty much leaves readers alone to experience traveling in those remote places for themselves. Rather than trying to account for things, he just feels the obligation to take note of them, a vast striving for connection."

As I put on my own raincoat and prepare to walk in Basho's footsteps, I harbor no delusions that I am about to travel through an ancient Japan like that of the *Narrow Road*. As the scholar Donald Keene reported, "Each place it describes is totally transformed. Senju, the first leg of Basho's

journey, is now a bustling commercial district, and Soka, where he spent his first night on the road, contains a mammoth housing development. But the truth of *The Narrow Road*... will survive such changes."

Former poet laureate Robert Hass paraphrases Basho this way: "Avoid adjectives of scale, you will love the world more and desire it less." Following that admonition, I have neither large nor small expectations. I do know that even today, eternal landscapes and age-old shrines can be found along Basho's route, connecting an open-minded traveler to the past in ways no human industry can impede. Besides, beauty is found not only in what you observe with compassionate perspicacity but also in how you come to know yourself when alone. Meandering along farmland roads on foot or riding in a car in 21st-century Japan, staying the night in a traditional inn near mount Gassan or in a business hotel in Tokyo, I will seek refuge in the indispensable idea of Basho.

Basho is said to have told a student that he often "held forth" with great Chinese and Japanese poets of the past, calling one such occasion a "conversation with ghost and ghost-to-be." For over a year now I've been thinking of my journey as a kind of portable séance, an ongoing dialogue with Matsuo Basho. I will pray for decent weather (I'll be traveling during typhoon season), good moon viewing, and quiet hours to fill notebooks. And step by step I will happily define myself as a ghost-to-be.

▲ **Dispatches** Read about Howard Norman's month-long journey along Basho's Trail in an online journal at ngm.com.



Listen! a frog
Jumping into the stillness
Of an ancient pond!

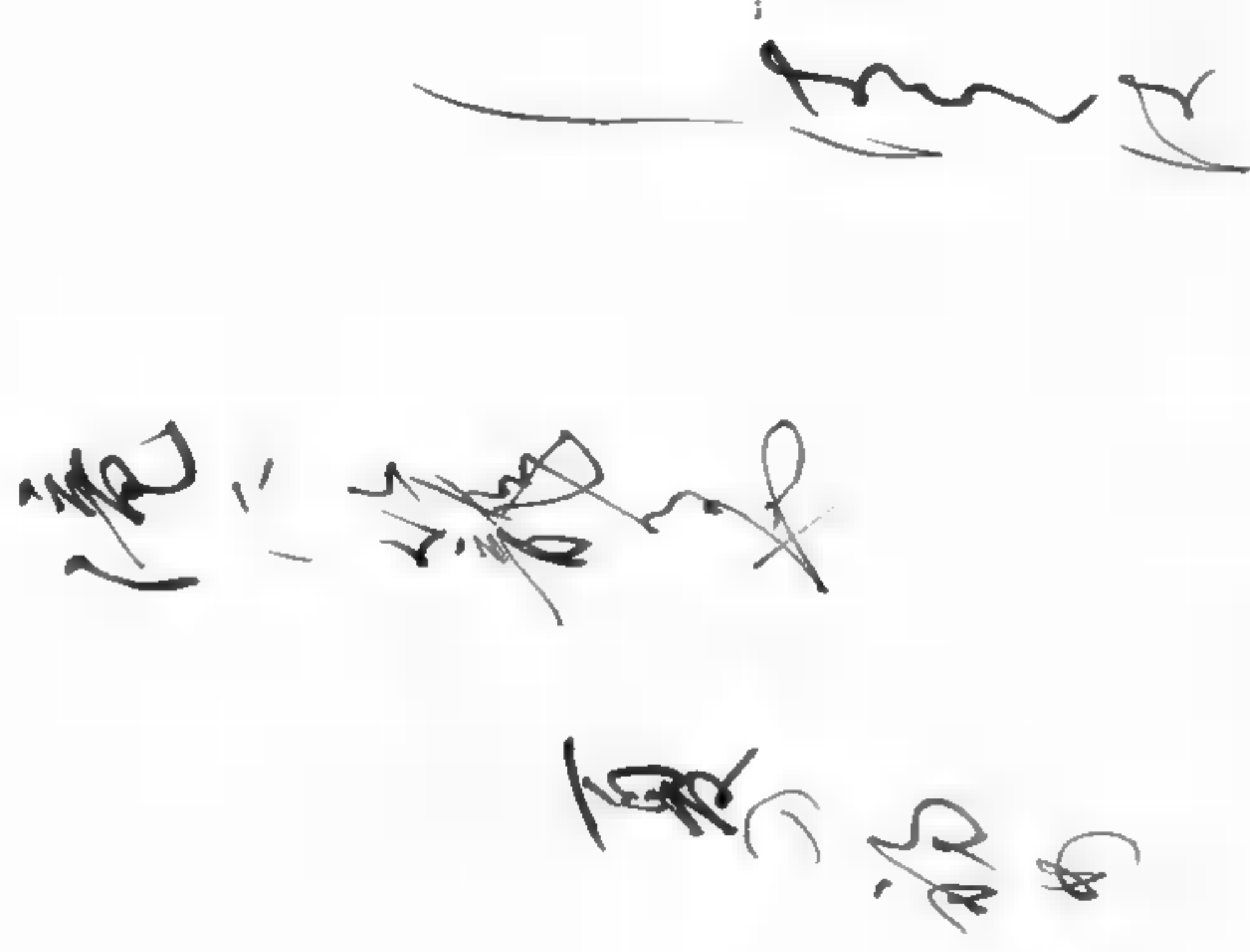
Spring Days, 1686



The splash of a frog, a cricket chirping from beneath an empty samurai helmet, "the cool fragrance of snow": Such closely observed moments in nature, often marrying unlikely elements, distinguish Basho's poetry. Haiku (a three-line verse like the one rendered at left in Japanese calligraphy and in translation) originated as the first verse of longer poems. Using plain language in the service of spiritual insight, Basho raised the form to literature, each poem like a polished stone that, when dropped in water, creates an infinity of ripples.



Shroud-like veils of falling water on the Abukuma River evoke the ghostly presence of past poets whose words kept Basho company on the rugged trail. Hoping to "feel the truth of old poems," Basho plotted his route to pass sites known as *uta-makura*, or poetic pillows: shrines, mountaintops, cherry-tree groves, and other spots memorably described by other writers. Many of the haiku in his book allude to these earlier verses—Basho's way of adding layers of mood and meaning to the landscape he evoked.



There we did begin,
Cloistered in that waterfall,
Our summer discipline.

Narrow Road, 1689



Sadly, I part from you;
Like a clam torn from its shell,
I go, and autumn too.

Narrow Road, 1689

A piece of calligraphy in black ink on a light background. The text is written in a cursive, flowing style. The characters are arranged in three lines, reading from right to left. The first line contains the characters '秋も去る' (Autumn also goes), the second line ' clam shell' (貝殻), and the third line 'I part from you' (別れ). The brushwork is expressive, with varying line thicknesses and some ink bleed-through.

A meditative observer, Basho paid heed to nature's modest dramas, like a leaf floating through reflections in a mountain stream. Sights like this reminded the poet that life is fleeting. At a fort fallen into ruins, he wept as he wrote, "A mound of summer grass: / Are warriors' heroic deeds / Only dreams that pass?" His closing haiku (left) hints at Basho's sense that his own days were waning. He died in 1694, not long after finishing his book. Three centuries later, Basho's words still touch a chord with travelers sensitive to language and landscape. □



The suburbs of Phoenix, Arizona, require a lot of water to keep up appearances—and to keep the desert at bay.

DRYING OF THE WEST, PAGE 90 **Water-Watchers**

One of the simplest ways to save water is to pay attention to how much you use. In one study, college students dribbled away 11 percent less when their dorm rooms were fitted with water monitors. Conventional water meters can be hard to read. One system, available soon, tracks water and energy use and displays gallons and dollars spent on a screen. A few simple lifestyle changes can drop consumption numbers. Turning off the tap while brushing teeth can save 50 gallons a week. A low-flow showerhead can reduce the annual shower budget by 2,600 gallons or more. Deeper savings might require higher technology:

■ **In the tank** Dual-flush toilets let users opt for a full flush (1.6 gallons) or a half: Touch a button to choose. Household savings can top 10,500 gallons a year.

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■ **Keep off the grass** Watering accounts for 30 percent of suburban family water use. Drip irrigators need half the water sprinklers do. Collect rainwater to water plants.

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U2 3D

**AN EXTRAORDINARY MARRIAGE OF MUSIC AND TECHNOLOGY.
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For over a quarter century U2 has been recognized not only for its musical invention, but for its incomparable gift for reaching millions of fans through new technologies. The group's live shows immerse concertgoers in multisensory experiences, whether through its groundbreaking use of video screens and LED jumbotrons in the 1990s or, more recently, the use of dimensional, lighted-bead video curtains. U2 has always innately understood how to make the greatest impact on its audiences and to convey messages both overt and covert through technological innovations. The band's embrace of cutting-edge technology is evident in a stunning new film that marries advanced digital 3D imagery and surround sound with the unique excitement of a live U2 concert. **U2 3D** takes viewers on an extraordinary cinematic journey, a quantum leap beyond traditional concert films, in the first ever all-live, all-digital 3D experience.

"Bono wanted to go somewhere magical" with the creation of **U2 3D**, says director Catherine Owens, who has worked frequently with the band as visual content provider for such U2 tours as "ZooTV," "PopMart," "Elevation" and

"Vertigo", and other projects. Seeking to intensify the ecstatic emotions evoked by U2's live concerts, Owens has made a film that captures the band members' relationship with each other and with their devoted fans.

Technologically advanced

U2 3D — the first digital 3D, multi-camera, live production — came to life through the passion and production savvy of 3ality Digital, one of the world's leading live-action, full-service production companies specializing in advanced 3D technology.



Today's cutting-edge 3D is a far cry from the mid-20th-century technology that used dated, dull and muddy color-separation methods. Theatergoers now don state-of-the-art glasses featuring polarized lenses that provide crisp, true-color images without the eyestrain and headaches common with the earlier, low-quality, red and blue-lensed glasses. "Digital 3D now provides an amazingly lifelike experience, allowing the viewer to be drawn in as a virtual participant in a three-dimensional space," says Sandy Climan, CEO of 3ality Digital, and one of the executive producers of **U2 3D**.

Steve Schklair, the film's 3D and digital image producer, found that an early challenge in the production phase was gathering "just about every digital 3D camera system in the world" — what would amount to the largest collection of 3D camera technology ever used in a live-action project. The team set out to capture the band during the "Vertigo" tour's huge outdoor stadium show in South America and followed the band to Mexico City, Sao Paulo, Santiago and Buenos Aires.

All told, over 100 hours of footage were shot, documenting a set list that during two weeks included such seminal U2 songs as "Pride (In the Name of Love)," "New Year's Day," "Sunday Bloody Sunday," "Where the Streets Have No Name," "With or Without You," "Bullet the Blue Sky," "The Fly," "Miss Sarajevo" and "One," as well as more recent tracks such as "Beautiful Day," "Vertigo," "Sometimes You Can't Make It on Your Own," "Love and Peace or Else" and "Yahweh."

Putting music on the picture with 3D

"What's exciting about seeing U2 is that its concerts are totally engaging and take you through the songs on a powerful journey," says John Modell, who produced the film along with Jon Shapiro, Peter Shapiro and Catherine Owens. "**U2 3D** is neither just a concert film nor a front-row seat to a live show, but a new cinematic experience that

brings viewers into the pulsing energy of a stadium concert in an unexpectedly intimate and surprisingly realistic way."

"We believe that music is one of the most powerful expressions of culture," says Lisa Truitt, president of National Geographic Cinema Ventures, which is distributing the film. "We hope that the film will deepen the experience of music and culture through the groundbreaking use of immersive 3D technology."



The end result of this massive undertaking is truly breathtaking: an opportunity for new and old fans of U2 to be transported from their seats and virtually become part of one of the band's greatest performances in **U2 3D**. As the first ever live-action film to be shot in the digital 3D format, **U2 3D** will only be seen in 3D. The film launches in limited release to select theaters (including those equipped with high-definition digital projection systems as well as the incomparable IMAX® 3D film format) on January 25, with a wider opening in mid-February.

(TRANSCENDENT)

—Esquire

(EXUBERANT)

—Variety

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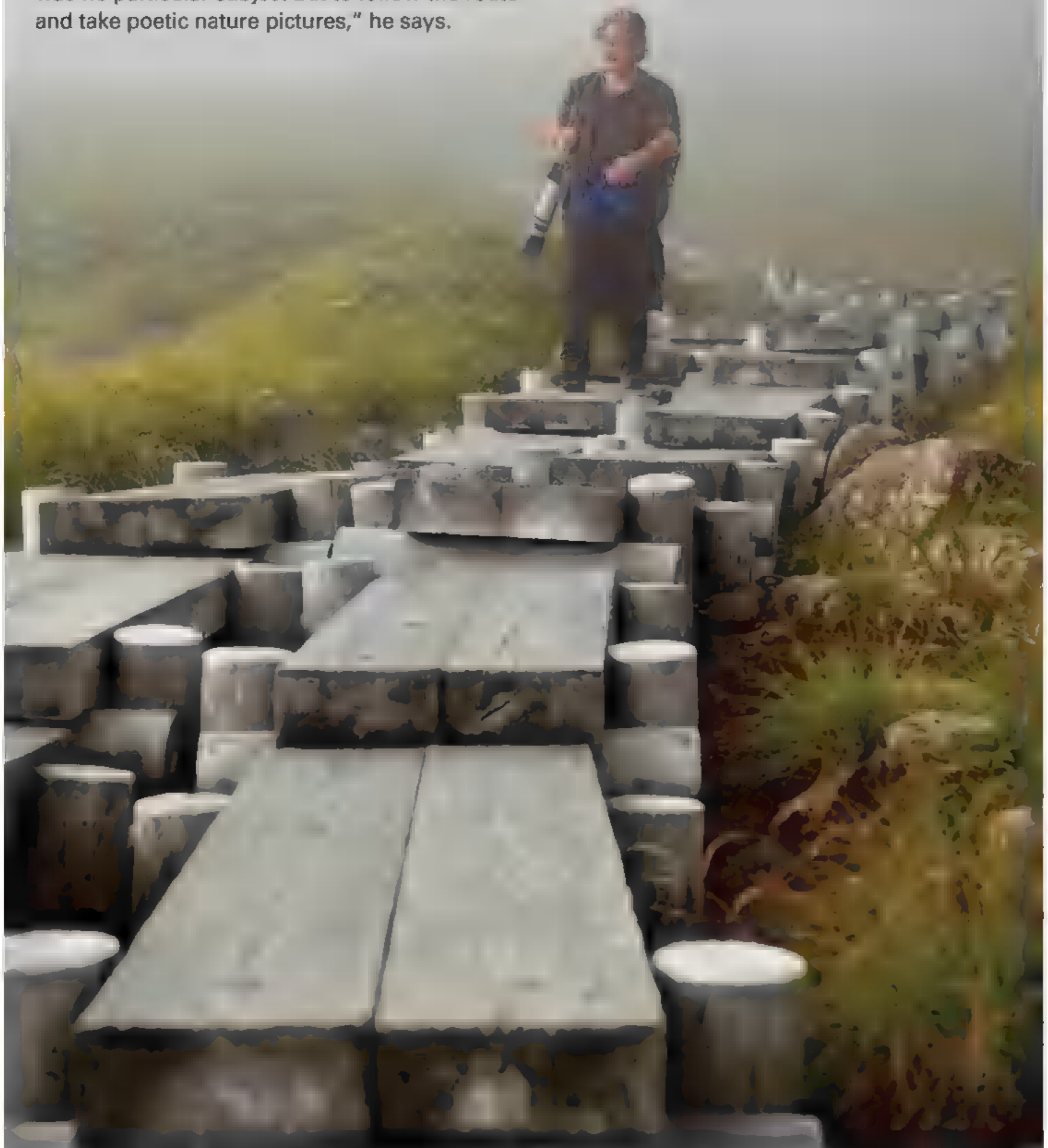


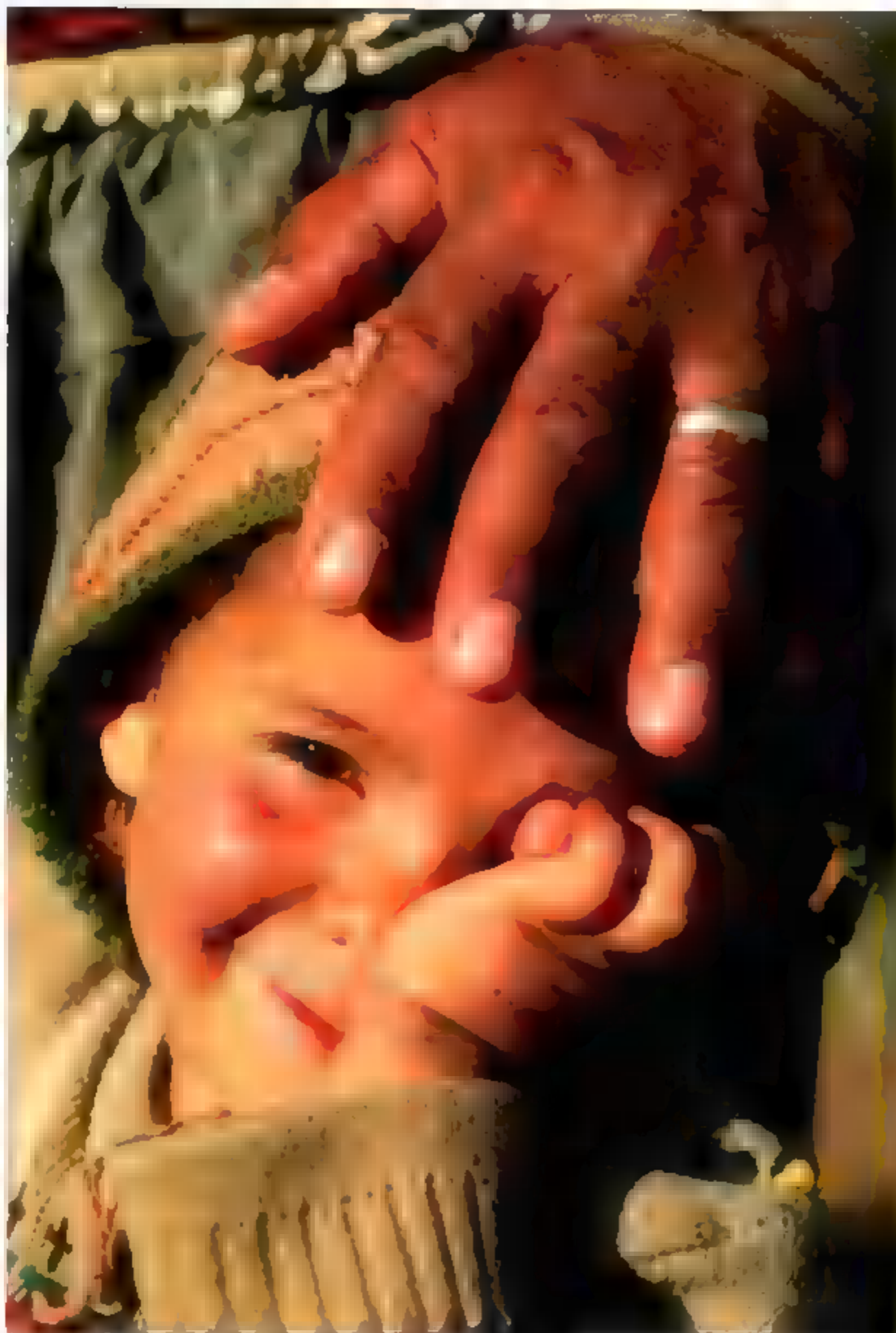
www.U23Dmovie.com



ON ASSIGNMENT **On Nature's Trail**

In May 1689 Japanese poet Matsuo Basho set off on a five-month walk through northern Japan, then a wild frontier. His trip inspired him to write a now classic book of poetry and prose. More than three centuries later, photographer Mike Yamashita followed the same trail. He took two-week trips in the spring, summer, and fall, the three seasons of Basho's walk, carrying several translations of the poet's journal. "There was no particular subject but to follow the route and take poetic nature pictures," he says.





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McCurry dresses to blend in.



ON ASSIGNMENT Afghan Pop When the Taliban ruled Afghanistan, photography was illegal; since those leaders lost power in 2001, photo studios have flourished. Steve McCurry visited such a place himself in Kabul while shooting the Hazara story, seeking out an old-fashioned technique in which black-and-white photos are hand-painted with watercolors. "I don't run around with a turban in Afghanistan all the time," he says—but the woolen hat was nice and warm. Another souvenir of his "30 or 40" trips to Afghanistan: his new book of photographs, *In the Shadow of Mountains*.

➤ **Art Gallery** See more Afghan portraits by photographer Steve McCurry at ngm.com.

If you own or owned a high efficiency gas furnace, you could get benefits from a class action settlement.

Includes Carrier, Bryant, Payne, and Day & Night furnaces made and sold since January 1, 1989.

Para una notificación en Español, llamar o visitar nuestro website.

A nationwide settlement has been reached in a class action lawsuit about whether Carrier Corporation ("Carrier") failed to disclose alleged defects in the secondary heat exchangers of its high efficiency gas furnaces. The settlement provides benefits to those who own or owned a high efficiency gas furnace.

If you're included, you may send in a claim form to request a payment, or you can exclude yourself from the settlement, or object to it. The U.S. District Court for the Western District of Washington authorized this notice, and will have a hearing to decide whether to approve the settlement, so that benefits can be issued. Get a detailed notice at www.FurnaceClaims.com.

WHO'S INCLUDED?

The Class includes anyone who currently owns a Carrier 90+% high efficiency condensing gas furnace made and sold since January 1, 1989, and former owners of these furnaces who had a secondary heat exchanger failure. These furnaces were sold under the brand names "Carrier," "Bryant," "Payne," and "Day & Night." A list of the included models is available by calling 1-866-517-2490 or going to www.FurnaceClaims.com.

WHAT DOES THE SETTLEMENT PROVIDE?

Carrier will pay eligible Class members who had a secondary heat exchanger failure up to \$270 and offer an enhanced 20-year warranty on secondary heat exchangers in their high-efficiency gas furnaces. Carrier will also provide a technical bulletin to furnace dealers to help identify furnaces eligible for coverage under the enhanced warranty. The settlement doesn't mean that any law was broken, and Carrier denies it did anything wrong. Other benefits and more details about the settlement can be found in a Settlement Agreement which is

available at www.FurnaceClaims.com.

HOW DO YOU ASK FOR BENEFITS?

You do not have to do anything to receive the enhanced warranty. However, to request a payment for a past secondary heat exchanger failure you must complete and submit a claim form. You can submit a claim form at www.FurnaceClaims.com. The claim form describes what you must provide to prove your claim and receive a payment. Please read the instructions carefully, fill out the claim form, and submit it online or mail it postmarked no later than **August 1, 2008** to the address on the form.

WHAT ARE YOUR OTHER RIGHTS?

If you don't want to be legally bound by the settlement, you must exclude yourself by **March 21, 2008**, or you won't be able to start a lawsuit against Carrier on your own about the legal claims in this case. This case does not affect personal injury, wrongful death, or emotional distress claims. If you exclude yourself, you can't get any benefits from the settlement, but you keep your original warranty rights. If you stay in the settlement, you may object to it by **March 21, 2008**. The detailed notice explains how to exclude yourself or object.

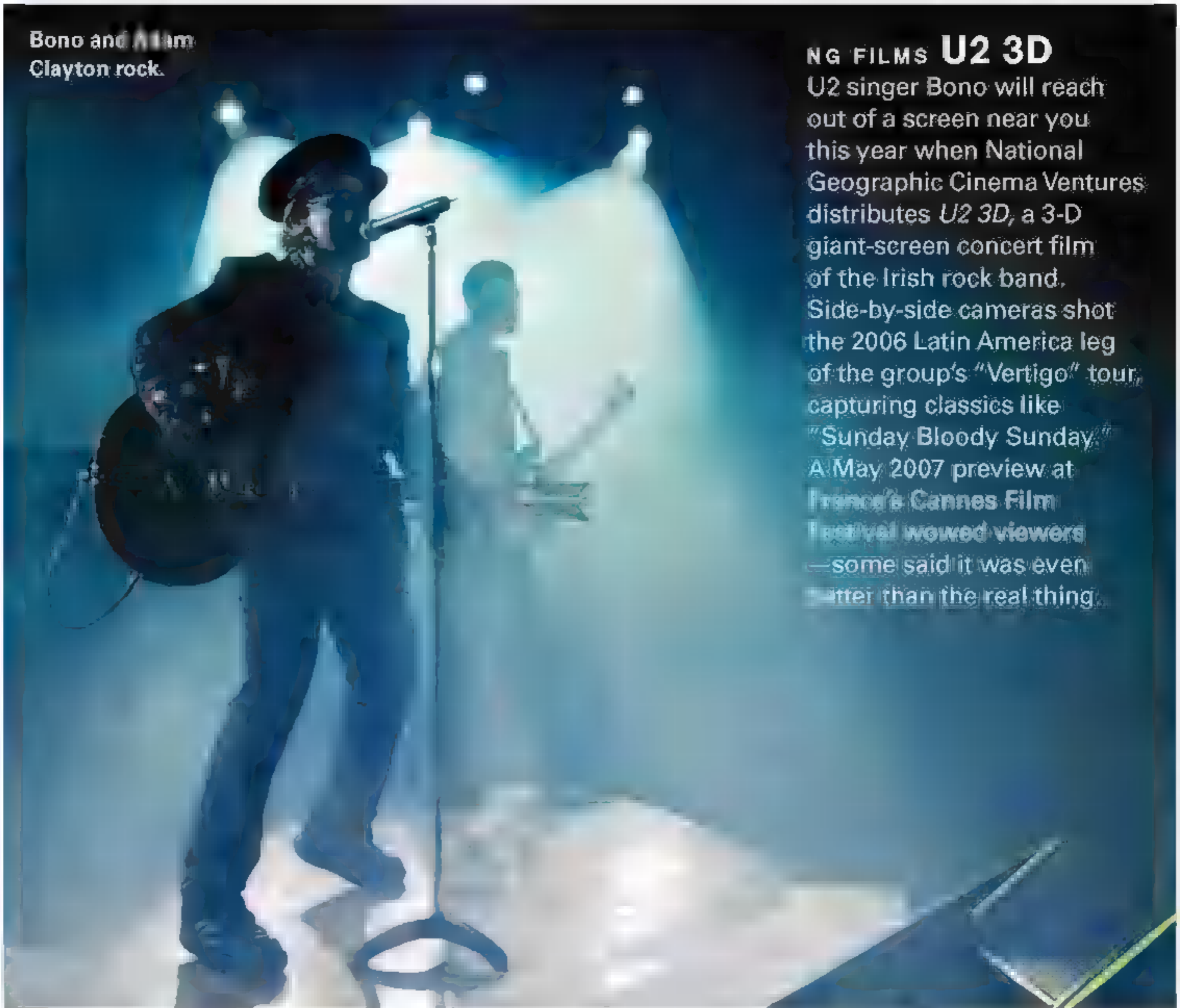
The Court will hold a hearing in this case, known as *Grays Harbor Adventist Christian School v. Carrier Corporation*, No. CV05-5437, on **April 22, 2008**, to consider whether to approve the settlement, and a request by Class Counsel for fees, costs, and expenses of up to \$9,950,000. Class Counsel will also ask for a payment of \$3,500 to each Class Representative, who helped the lawyers on behalf of the whole Class. You or your own lawyer may ask to appear and speak at the hearing at your own cost, but you don't have to. For more information, go to the website shown below.

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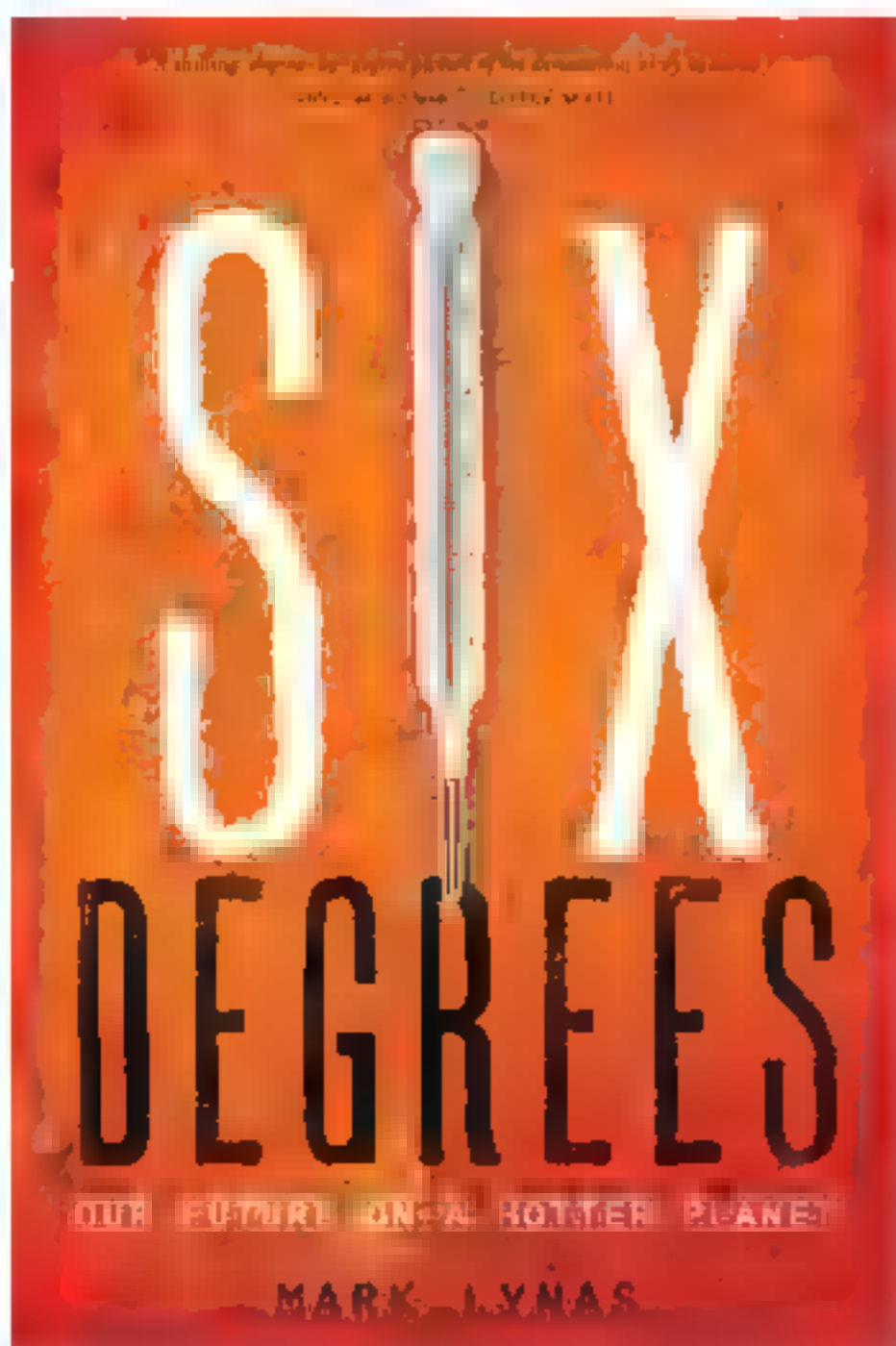
INSIDE GEOGRAPHIC

Bono and Adam Clayton rock.



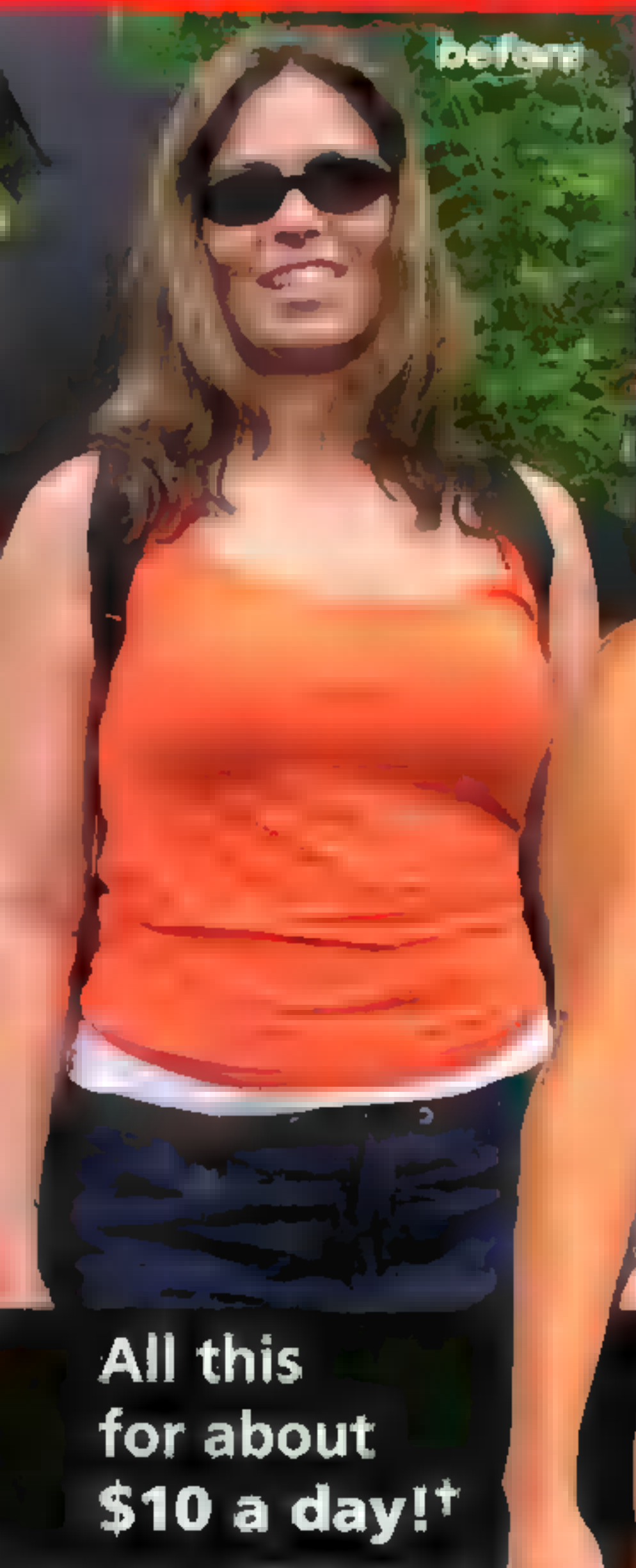
NG FILMS **U2 3D**

U2 singer Bono will reach out of a screen near you this year when National Geographic Cinema Ventures distributes *U2 3D*, a 3-D giant-screen concert film of the Irish rock band. Side-by-side cameras shot the 2006 Latin America leg of the group's "Vertigo" tour, capturing classics like "Sunday Bloody Sunday." A May 2007 preview at France's Cannes Film Festival wowed viewers — some said it was even better than the real thing.

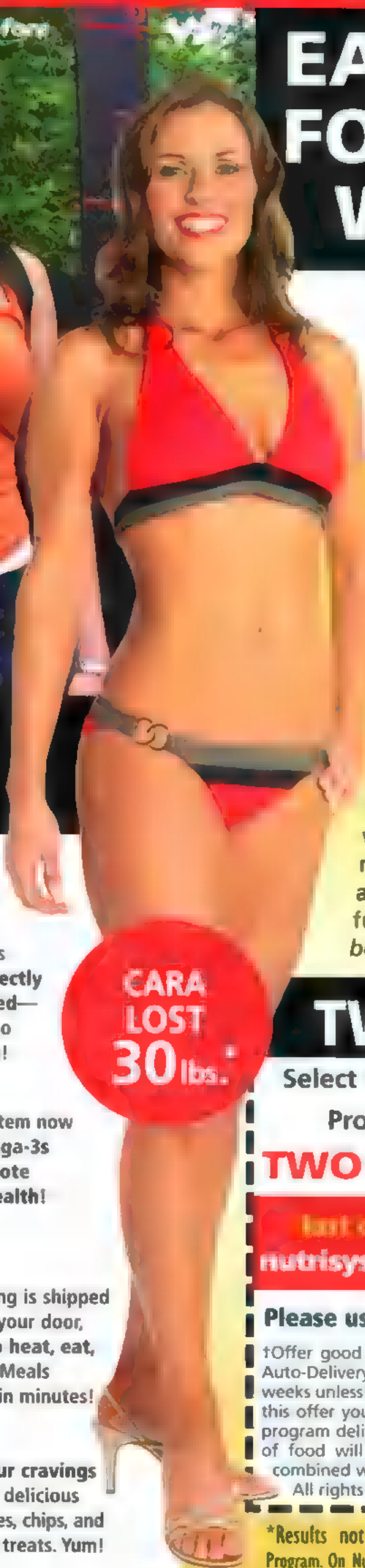


Plus Six Degrees Scientists have made reams of predictions about how the Earth will change as its climate warms; small changes might have a big impact. For *Six Degrees Could Change the World*, premiering on the National Geographic Channel this month, National Geographic Emerging Explorer Mark Lynas imagined the possibilities degree by degree. Lynas is also the author of the National Geographic book *Six Degrees: Our Future on a Hotter Planet* (left). The show and the book describe effects of rising temperatures in the present and the future. Also offered: ideas about what everyone can do to help before climate problems get too hot to handle.

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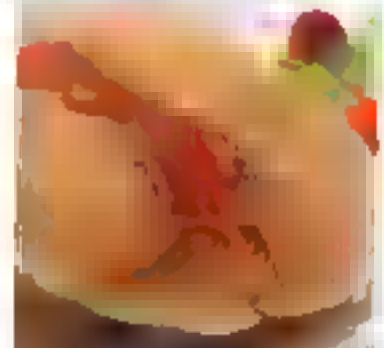


before



after

breakfast



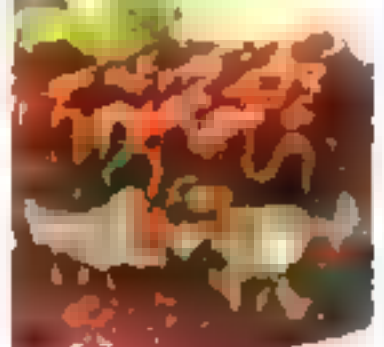
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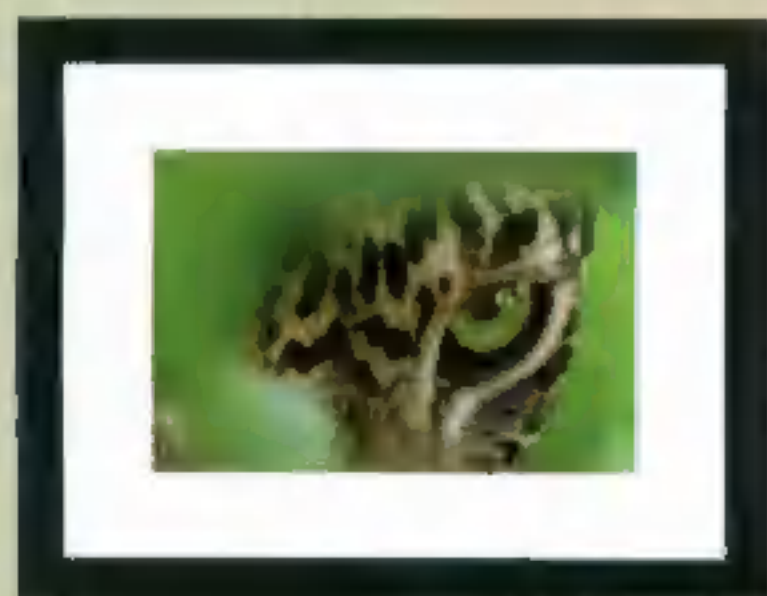


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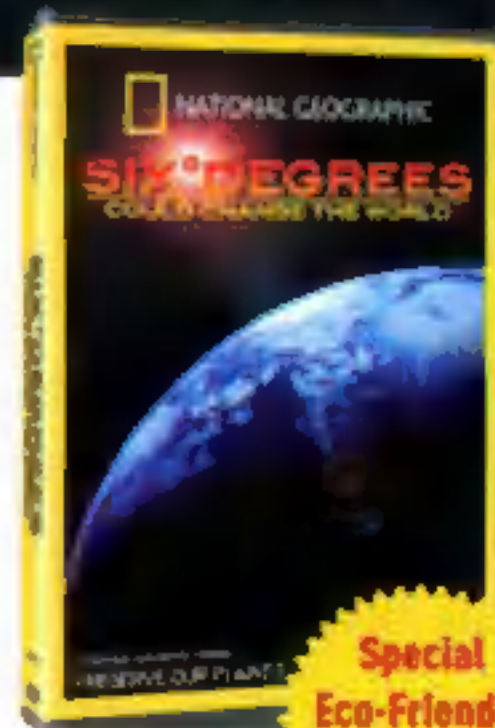
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Going Home Rough-hewn boards sketch the path across a graveled river for a man “wending homeward his weary way after a strenuous day in the rice fields.” The photo by Eliza Scidmore—writer, photographer, geographer, and the first female board member of the National Geographic Society—ran in the July 1914 *Geographic*. Scidmore loved Japan and made the first of many visits to the country in 1885. The last occurred in 1929, when her ashes were interred in a Yokohama cemetery. —Margaret G. Zackowitz

👉 **Flashback Archive** Find all the photos at ngm.com.

PHOTO: ELIZA R. SCIDMORE

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The average woman spends *11 years out of the workforce* taking care of family.



LEAVING HER WITHOUT ENOUGH
RETIREMENT MONEY TO TAKE CARE OF HERSELF.



Those 11 years are spent doing important work, caring for children or elderly parents. But they can also hurt her ability to retire.

Fact is, women are still earning less than men do, and they live longer. So they need to save even more for retirement. Unfortunately, those 11 years out of the workforce put a woman even further behind, costing her an average of \$659,139 in earnings.

How can we help America's women close this retirement savings gap? Allstate has some ideas:

1. MAKE EVERY EARNING YEAR COUNT.

Right now, only 47% of working women participate in a company retirement plan. American businesses can do much more to help that number grow. 401(k) strategies such as **company matches, encouraging participation by part-time workers, automatic enrollment and automatic increases in contributions as employees get raises** are all proven ways to help **build savings**. And the earlier an employee starts saving, the more prepared she'll be for retirement.

2. PROMOTE SPOUSAL IRAs.

Non-working women (and men) can invest up to \$4,000 to grow tax-deferred in a Spousal IRA for the 2007 tax year, as long as there is a spouse in the workforce. The limit will increase to \$5,000 in 2008.

3. EDUCATE: OFFER FINANCIAL SEMINARS FOR EMPLOYEES AND SPOUSES.

Knowledge is power: 53% of women (and interestingly, 33% of men) with a retirement plan said they'd **increase their annual contributions after they attended a financial education seminar**.

Women care for America. It's time we showed that America cares about their future.

Let's save retirement by saving for retirement.
THAT'S ALLSTATE'S STAND



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